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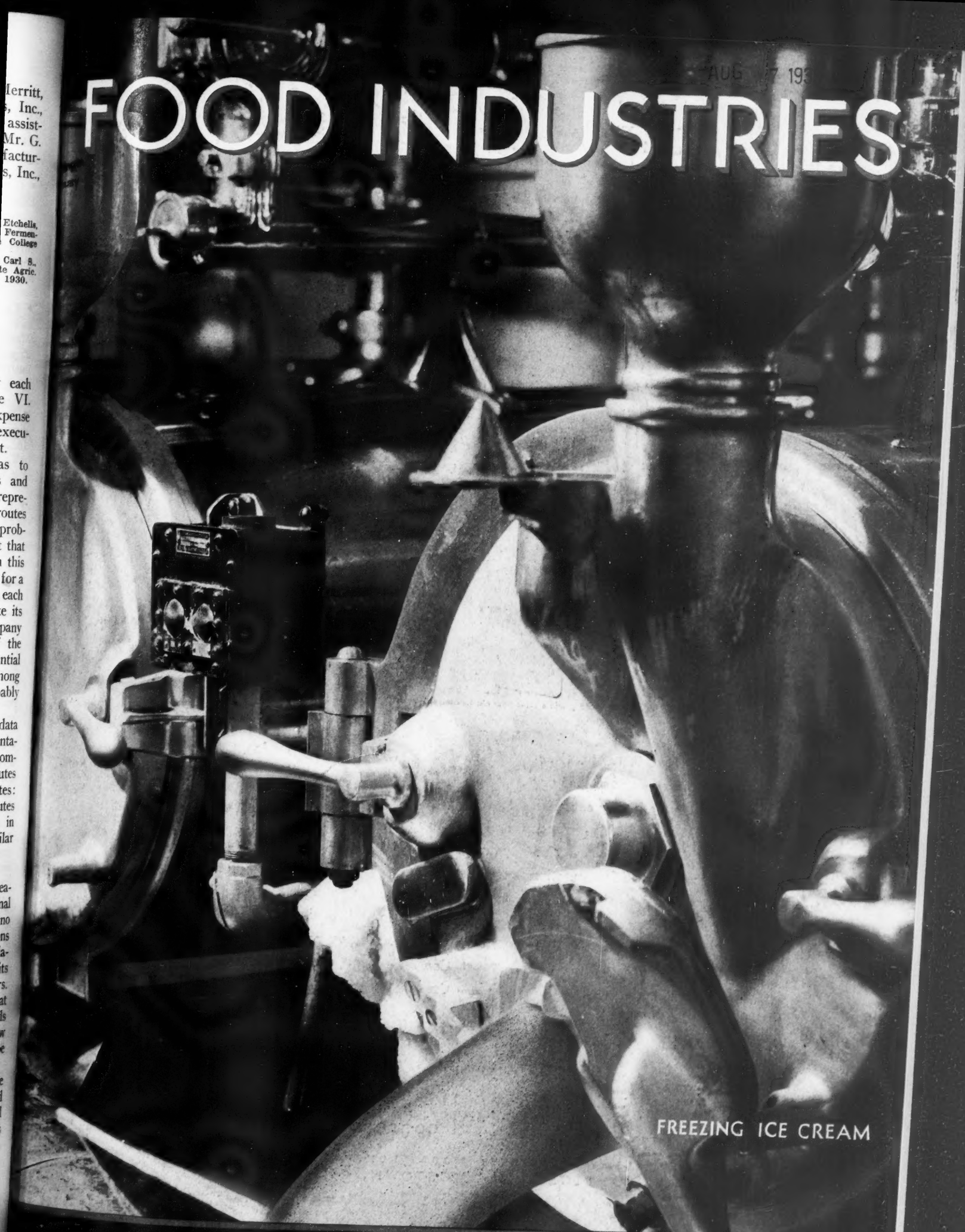
FOOD INDUSTRIES



FREEZING ICE CREAM

AUGUST, 1935

PUBLISHING COMPANY, INC.

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in manufacturing egg crystals

55 fermentation tanks like the above were installed in this food plant over 3 years ago. Metal discoloration and product taint now are unknown. Name on request.

Product discoloration often is costly. Especially is this true in the manufacture of egg crystals, for raw eggs have a highly corrosive action on most metals. » » » But this problem no longer exists for this prominent manufacturer. More than 3 years ago, 55 fermentation tanks were installed, made of stainless ENDURO, Republic's perfected stainless steel. Product discoloration and tainting immediately disappeared, for the raw eggs had no effect on the surface of this unusual metal.

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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

★

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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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Laurence V. Burton, Editor

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AUGUST 1935

THE TALK OF THE INDUSTRY

BEFORE taking up the serious matters of life, let us shed a tear or two over the efforts of the Treasury Department to collect excise taxes on "hard likker." One might surmise that food manufacturers had nothing to do with the problem—but alas how ill advised, nay how base, is such a surmise.

Life was simpler back in the prohibition days of virtuous memory. Anyone who had the money, even if he were so ill-bred that he would violate the law, could buy almost any-

thing he wanted even unto "steam-tight copper oil tanks," with no questions asked.

A bag of sugar, a barrel of molasses, a few pounds of yeast, even water itself, of course, were the presumptive implements of sin if they ultimately landed in the same liquid-tight receptacle. But, of course, no right-thinking bootlegger ever knowingly made the producer of his supplies a party to a conspiracy, and no manufacturer ever had any reason to question those who bought supplies in carloads.

Business was simple in those days—it was done for cash and seldom were there requests for technical sales services. Hence it is said that uninformed "bakers" used to add as much as 300 lb. of yeast to a ton of sugar, blissfully ignorant of the methods of feeding yeast to make it grow.

In the wake of repeal, however, a Congressional resolution authorized the Treasury Department to require all vendors of sinful things like sugar, raisins, yeast, syrups, casks, barrels, bottles and labels, to keep a record of the name, address and automobile license number of all persons buying above a specified amount of the foregoing supplies.

Alas! The Internal Revenue Bureau was literally swamped by many thousands of daily reports that bakers bought yeast, that confectioners and bakers were buying sugar, or that vinegar bottlers were buying bottles and labels. To stop this paper avalanche that threatened to bury the Treasury Department, a new set of orders were issued requiring reports of sales to those whose businesses were not well established along well-known lines in the food industry, especially little-known cash-and-carry customers of sinister mien.

But the cash-and-carry customers then rented cars and trucks and gave fictitious names. In this case an auto-license number meant nothing of serious import. And so the government countered by stationing observers at strategic points where the scenery was reported to be interesting even if not beautiful. And there we leave you. If you are not weeping by now, we fear that any further recital would be redundancy, i.e., a superflous repetition.

A TALE is going the round of housewives in Scarsdale, N. Y., purporting to explain why the A. & P. stores in that village recently began to carry better quality meats than they had previously offered. It seems that Mrs. John Hartford, wife of the president of A. & P., one day

forsook the A. & P. stores of her own town of Valhalla to do her marketing in a neighboring town where she was unknown to the store clerks.

To her husband's inquiry at dinner that night, as to where in the world she had gotten that tough piece of beef, she blithely replied,

"I bought it in one of your *great* A. & P. stores at Scarsdale."

MIRABILE DICTU!!! or words to that effect. James Roosevelt has become a food manufacturer—the big shot of the National Grain Yeast Corp. of Belleville, N. J. If what he did to the insurance business up in Boston is any criterion of his future activities in the yeast

business, well all we can say is that Standard Brands never saw any competition before. Insurance brokers in Boston town are still in rags after he copped all the business there was.

What About Instalment Buying?

INDUSTRY is faced with two opportunities: (1) A government drive to foster instalment buying of equipment under FHA loans; (2) Opportunity to borrow under the FRB method of long-term loans.

The suggestion to buy on the instalment plan fills many a man with distrust—if not horror. But the decision to modernize, we believe, should not be made on the basis of unhappy personal recollections regarding instalment buying. It should be made solely on whether the money can be spent for a good investment; whether the modernized equipment will pay for itself in a reasonable time.

If modernization is a good investment, then it is a wise expenditure. If it is not a good investment, it appears to us to be an unwise expenditure—one that should not be made even if the treasury were overflowing with cash, let alone doing it on borrowed money. How the borrowed money is to be repaid is a purely secondary matter.

Those who are in doubt about the possibility of profits from an investment in modernization should engage a consulting engineer. Business modernizes for profit, not for the sake of being a good fellow.

Ample Bank Credit Available

MONEY for practically any purpose, except to repay old debts, is available to any concern which is a good credit risk. Two government institutions, the Federal Reserve Board and the Federal Housing Administration are now empowered to insure banking loans to businesses which qualify. There is no excuse for lack of adequate working capital or proper low-cost manufacturing facilities today. The government is so anxious to stimulate business that these two institutions are making drives to force the commercial banks back into the banking business through this newly created method. Business need not suffer from lack of reasonable credit.

Taxes Wasted, While AAA Trifles

MANY firms that have been paying processing taxes have been playing safe by entering some kind of a suit against the government, before the A.A.A. amendments are enacted, to secure relief from further tax liability or from paying accrued taxes. Some of these suits are cases of genuine distress, but most of them are based on a belief that A.A.A. is as unconstitutional as some of the other New Deal experiments of recent memory.

Our own conviction is that the latter view is correct, but we have a hunch that when the Supreme Court declares it to be unconstitutional, the law will be re-enacted by the present Congress making the processing tax an excise to be paid into the United States Treasury instead of to the Secretary of Agriculture. Such a procedure will, of course, require Congress to enact special legislation in order to pay any benefits to the farmers.

A further conviction is that A.A.A., amended or not amended, is piddling, ephemeral, immature, toying with grave, fundamental, economic problems. We can see eye-to-eye with Secretary Wallace on the basic premises: (1) the limited capacity of the human stomach; (2) too much land under cultivation; (3) the probable permanent loss of a large portion of our foreign market for an amount of agricultural commodities equivalent to the 50,000,000 excess acres under cultivation, actual or potential. But right from that point onward, FOOD INDUSTRIES cannot agree with Secretary Wallace as to the remedy.

Being much more inclined to believe in the self-corrective operations of the supply-demand system than in an economy planned by any human beings we ever knew, we are dubious

Hors d'Oeuvres

• Cheese racketeers in New England have been putting mineral oil in their product instead of butterfat. Maybe the idea is to make the cheese less binding!

• *In Santa Barbara, Calif., there is on foot a move to prohibit delivery of milk before 7 a.m. Apparently the late-sleeping Santa Barbarians (?) consider the dairy industry a public nuisance. Apparently, they haven't heard about pneumatic-tired wagons and silent-shod horses.*

• Some of Uncle Sam's sailors have found that tomato ketchup is good for something besides food. They find it much more effective for polishing brass than the non-inflammable polishes allowed on board. P.S.—Don't let this get out or the guinea-pig sympathizers will label the stuff diabolical poison.

• *A former head of the Indiana State Police department has been named to administer milk marketing agreements in the Indianapolis area. Which would seem to put the Hoosier dairymen in a class with the unruly citizens.*

• If the frankfurters consumed in America annually were placed end to end they would encircle the earth sixteen times. Maybe you think that's a lot of bologna, but it isn't. Bologna ranks second in popularity among sausage products, total consumption of which is 1,400,000,000 lb.

• *There has been perfected an electric garbage grinder which permits disposal of food refuse via the kitchen sink. Now if the food manufacturers would just adopt cans and bottles which evaporate when empty the housewife's troubles would be solved.*

• Beware of attempts to foster consumption of foods by state legislation. Wisconsin's 15-cent tax on oleomargarine containing cottonseed oil has caused the South to threaten boycott of the Badger State's dairy products to the tune of millions.

• *Have you heard the bacteriologists' motto?—"We've very little money, but we do see life!"*

• Debating the proposed marketing agreement for bee keepers, Senator Glass brought up the subject of bee birth control. "I understand that drone bees, after they have had their day in court, are said to die," he commented. "But I should like to know just how the Secretary would control the queen bees." Maybe he could convince them it's plebeian to have more than two or three offspring.

about the real wisdom of such tinkering as A.A.A. However, being realists, we can concede the possibility of the political necessity of doing something. Yet to pay farmers for *not* producing when their lands are always ready to be replanted as soon as the benefits cease, when every last one of them knows now that the answer is self-control, is about as permanent a remedy as throwing a bucket of water on burning gasoline.

The only permanent remedy for the national over-development of our agriculture plant is to cut down the acreage under cultivation by outright purchase or long-term leasing. All else is trifling, inane and weak-kneed. Unless a permanent remedy is created the whole mess had better be thrown overboard.

Wagner Bill—A Hoax

ALTHOUGH the Wagner bill is now law, it is very unlikely that it will long remain so. Cudahy Bros. of Milwaukee are the first to challenge it. Its fundamental weakness goes way beyond the mere matter of constitutional limitations upon Congress to interfere in purely intrastate matters.

In effect the Wagner law is a one-sided affair which requires everything of the employer and nothing of the employee. Under it, employees can bargain collectively, can reach an agreement, and yet can subsequently refuse to work. And there is no way to compel men to work if they decide not to under our present form of government. Hence there is no way to compel employees to accept a responsibility equivalent to that which is imposed upon employers.

Senator Wagner knows this as well as anybody, yet he fought this bill through Congress despite its obvious defects. To make it a valid law will require that labor surrrender its constitutional freedom of action, its right to quit a job (not to be confused with its right to strike), and that is collectivism, enforced labor, slavery, or whatever name one can wish to call it. We do not believe that the most ardent enthusiast is ready for that—at least not for quite a little while.

Hence the conclusion is inescapable that the Wagner measure was moribund, even before it was enacted, and we feel that its enactment in the face of its known defects was brought about solely for subtle political purposes which will be apparent in 1936. No sincere, intelligent reformer would perpetrate such a hoax. Somebody sold the A. F. of L. a bill of goods.

Commending Informative Labeling

A.A.A.'s desire for dictatorial power and the opposition that all food industry should put up against it may cause some of us to think negatively, and forget the constructive approach to the labeling problem which is now under way.

Descriptive or informative labeling versus the impossible grade labeling is now in the hands of the technical experts who are working out the details of its application. FOOD INDUSTRIES commends the work and urges those to whom its future is entrusted to keep at it.

Irrespective of the future of government interference with business, better labeling is a distinctly forward move.

The Constitution—A Contract

MUCH unwarranted resentment against the Supreme Court is still coming from those who ought to know better. A good deal of it has come from men who themselves have taken solemn oaths to uphold the Constitution. One of them, still under that oath, is doing things today that are definite moves toward a violation of that oath. And because he is a lawyer by profession he cannot plead ignorance of legal matters.

Readers of FOOD INDUSTRIES will have many an opportunity to straighten out the thinking of employees and associates in the coming year, to the ultimate good of all. In a practical sense, the Constitution of the United States is a contract between the several states and the people thereof—a contract that forever binds their heirs, successors or assignees. The Supreme Court's job is to determine whether the terms of the contract are carried out when cases come to it for adjudication.

Congress, even though it comprises the representatives of the people, cannot alter that contract. Yet the contract itself specifies the ways in which it may be modified by the will *of all the people,* not the little handful sitting in Washington, most of whom seem to worship at the shrine of $4,880,000,000. If it is the judgment *of all of the people,* not merely a few of their representatives, that this contract should be revised, it can be done in a relatively short time, but only after thorough examination and debate.

It would be folly to entrust the "liberalization" of the Constitution to a Congress that enacts laws which it does not write without adequate debate and often without a record vote. If anyone indulges in silly talk about revolt let him be fully informed about the easiest way to change the contract; and, when the Constitution is changed, that the Supreme Court must interpret it in the light of the newly expressed will of all of the people.

Acme

Bringing the "New Deal" in person to the food industries. James Roosevelt, newly elected president of National Grain Yeast Corp., Belleville, N. J.

Inflation—When?

IN VIEW of current uncertainties relative to the public debt, it is incumbent on management to be constantly watchful of its future commitments and credits. In spite of the furore about new taxes the national budget can remain unbalanced without noticeable effect on prices until a wave of general pessimism and fear strikes the population. When that time comes there will be a general rush to convert money and credit into material things of intrinsic value. That time will come when business men fear that the government can no longer repay its debt—that our government's promises to pay are only prettily engraved scraps of paper.

Such a wave of fear will cause people with money to spend it. Business will begin to pick up slowly, then rapidly. At first it will seem like nor-

mal good business. Any hint that it has an inflationary origin will be met with scorn and ridicule by government officials and ultra-liberals.

But the prudent man will watch the signs of the times, in particular those which were mentioned in July FOOD INDUSTRIES, and will have his affairs in order. He will also realize that scorn and ridicule do not re-establish the government's credit. Only a balanced budget will do that.

Soak the Rich

SOAK the rich; redistribute wealth; penalize success; level off the inequalities; paralyze initiative; let us all live in the land of no opportunities —a flat, drab land of no economic future!

A splendid prospect from the eye of the frightened man without a job. But from the eye of the man who heads the successful enterprise it is anything but what President Roosevelt envisions.

The successful man knows very well how many livelihoods depend on his own personal ability. What we need today is more successful men—not fewer.

"Poor men wish that rich men could see how they live."

"Rich men wish that poor men could see how they work."

Butter vs. Butter

FOOD INDUSTRIES plays no favorites. We believe that all food manufacturers are in business for profit. We hope that all are able to get their share and, better still, that they will be able to maintain their earnings at reasonable levels year after year. We have no reason to try to influence one group at the expense of another. Nevertheless it is disconcerting to witness the opposition of butter producing interests against the Kleberg bill, H.R. 5587, which would put a tax of 10 cents a pound on imported fats and oils used for margarine manufacture and allow domestic fats and oils to be used without this tax.

If your heart and livelihood is in the butter industry it is well to give thought to the ultimate fate of your business as long as cotton control and other restrictions continue in states which are not now regarded as dairy states. If the South ever is forced to produce its own butter the Northern butter producer will be faced with a form of competition that trick taxes will not and cannot stop. It will make little difference whether the market, in that event is lost to Southern butter or to margarine. If the South goes into dairying in a big way the Southern butter market will be lost—forever.

Dumb Housewife

TO ALLAY further speculations as to the identity of the Dumb Housewife, who writes again in this issue of FOOD INDUSTRIES, it should be stated definitely that she is a very real woman. Despite entreaties from many of her readers as well as our own recommendations, she prefers the freedom of expression afforded by the cloak of anonymity.

In her efforts to cope with present-day housekeeping problems, she has penetrated much of the current hokum. The only instructions she has ever received from us when writing for FOOD INDUSTRIES are to interpret the housewife to the food manufacturer, to speak the truth, to hit hard.

The pen name, Dumb Housewife, is of her own choosing.

Dangerous Reciprocal Tariffs

TARIFF benefits are being gained by the food processing industries as a result of the State Departments' bilateral treaty negotiations. A substantial part of the total gained for American business from the Swedish treaty which becomes effective Aug. 5, is the opening up to American fruit processors of a more convenient road to that market.

But the price being paid by industry in general for small benefits to a special industry is tremendous. All industry is only beginning to realize that the Secretary of State is writing a new tariff act. He is cutting ruthlessly, in many cases thoughtlessly, into protective measures that are essential for the maintenance of American wage earner's standard of living.

If a few more bilateral treaties should be so negotiated, Congress is certain to take back the tariff-making power, and probably will find it necessary to tear up even the few treaties thus far formulated in more than a year of State Department effort.

In all this matter the difficulty is twofold. In the first place American concessions, harmless when granted to a single foreign nation, have a detrimental effect on American industry generally, apparently unsuspected at the State Department, because of the most favored nation treaties to which the United States is already committed. Thus an adjustment which is proper to make with Sweden permits serious new import competition from other nations because it becomes automatically available to substantially all other nations.

The second difficulty is one which could be easily corrected by frank, we might say even honest, methods of formulation. Secrecy now shrouds

How to Meet Processing Tax Uncertainties

THE times call for steady nerves and sound, clear thinking. Unlike the clearcut finality of the Supreme Court decision on NRA, the Boston Appellate Court decision on the unconstitutionality of processing taxes leaves great confusion until that decision shall have been reviewed by the Supreme Court and until we know what sort of A.A.A. amendments will be passed by Congress. To FOOD INDUSTRIES the following points seem clear:

1. Self-preservation requires that processing taxes, if paid at all, should be paid in escrow under protest, also that manufacturers subject to processing taxes should take the necessary legal steps to cover their action.

2. Still more important is it to avoid all possible confusion on prices. Proper procedure on step No. 1 should be supplemented by related procedure on writing clauses in sales contracts to protect the buyer and seller, no matter what decision the Supreme Court may make. On non-perishables subject to processing tax this protection is highly important. On perishables there is no need for such contractual protection: the goods will either spoil or move quickly into consumption, even during the brief period in which a court might be taking testimony and formulating judgment.

3. Avoid all uncertainty and unwarranted fears by prompt and correct action. People are going to keep on eating and living. Eternity is still ahead of us.

4. Do not overlook the politico-economic significance of the times. Whether we like it or not, we are living under an administration that seems determined to inflict its pet ideas on the country or ruin it.

Sound economic thinking and clear vision are needed.

every negotiation. Interested industry cannot find out what is being considered, much less what the State Department intends to do. There is no excuse for this type of confidential procedure. Its most certain consequence is that the State Department prevents itself from getting facts that are important in the negotiations.

Those food industries which temporarily benefit in part by these special duties should not be prematurely jubilant. The day of retribution is sure to come when the country recognizes the uninformed, illogical procedure of tariff slashing now being conducted by Secretary Hull. It is too much to hope that the food industries will escape the damage which is already all too evident in a number of other industries.

Barometric Package Testing

PACKAGES, in the food industries more than in any other, often require complete resistance to moisture vapor transfer. To test a new package for this quality it is customary to place it in a hot, high-humidity incubator for a few weeks and hope that this will be an adequate simulation of reality. And all too often it is not, because the test fails to include an important number of sizeable barometric changes — also known as barometric pumping.

If a package is supposed to be sealed tight, yet has a tiny leak somewhere, air will slowly enter the package when the barometer is higher than it was on the day the package was sealed. And, conversely, some of the air will leak out if the barometer falls. Hence, barometric pumping.

An inexpensive way to imitate barometric changes would be to connect the suction intake of a small motor-driven rotary or centrifugal blower with the particular incubator being used. Of course the incubator must be strong and fairly tight. As long as the blower runs and there are no large leaks into the incubator the air pressure inside will be below atmospheric pressure. How far below will be determined mainly by the speed, size and design of the blower. A mercury manometer can be used to measure the decrease. A 2-in. drop for six to twelve hours, repeated every day for the duration of the test, will be much more likely to show up the effect of leaks in the package itself than an uncontrolled test where this factor is entrusted to luck.

Of course, if a perfectly tight room could be maintained it might be a little more scientific to maintain a static partial vacuum. But the suggested way, while it depends on continuation of the blower to reduce the air pressure, will cost only a trifling amount for electricity compared to an air-tight incubator.

Question Everything

EVERY superintendent knows that one of the easy ways to cut costs is to put more goods through the plant with a given crew. But to know how and where to cut the corners requires constant study and questioning. A safe rule to follow is to take nothing for granted. Question every procedure.

At a certain canning plant this method is followed persistently with gratifying results. The production manager questioned the need for waste space around the crates of cans in a retort where they were being sterilized by steam under pressure. It looked like a total loss which could be saved by putting more cans in larger crates which more closely fitted the retorts. He had a set of three special crates made, was able to get 8 per cent more cans into a retort, and now has all of his crates so built that he gets 8 per cent greater production from the sterilizing department. The extra steam cost is negligible compared to the saving in time both in man and machine-hours.

Quality has not been changed nor is there any spoilage problem introduced. Yearly savings represent almost 100 per cent return on the cost of the new crates. It pays to be critical.

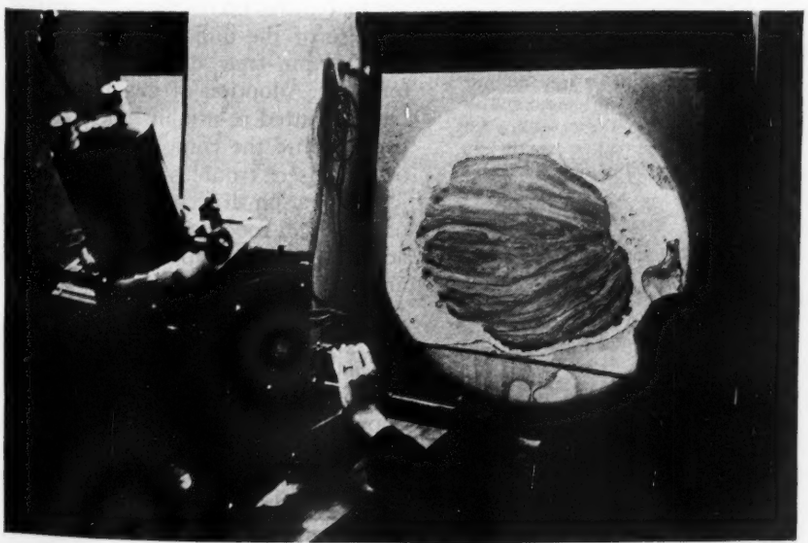
Volatile Flavor Cooking

ALTHOUGH neither is aware of it, the chap who cooks ketchup has a problem much like that of the chap who cooks beer wort in a brewery. Both are cooking a product in which there is a volatile flavor and either can alter his finished flavor quite noticeably by the way in which he handles his kettles.

In ketchup the volatile flavor under immediate consideration is the onion flavor, consisting of two parts —one non-volatile, the other volatile. In beer wort, the flavor is from the hops which, like the onion, embodies a volatile and a non-volatile flavor.

Delayed addition of the onion to ketchup makes it have a stronger flavor owing to a less complete volatilization of the strong volatile flavor. Likewise delayed addition of hops to boiling beer wort makes the beer have a better hop flavor.

In either case the amounts added are not changed: only the time in which the ingredients are in the boiling liquid is changed. There is this difference, however. Some brewmasters are after a certain type of hop flavor that can be attained only by adding part of the hops at the beginning of the boil and adding the remainder toward the end of the boil. When one understands the properties of his flavor-producing substances, he can obtain unusual results by very simple methods.



Examining specimen of meat in a German slaughter house under the new Hitler regime. The German Dietetic Board requires both testing and tasting. In this testing method a thin slice of the meat is pressed between glass slides and optically projected to a screen in a dark room where the 75-diameter magnification of the image makes histological and pathological examination easy on the eyes.

Food Fumigation
with Ethylene Oxide

The Second of Two Articles

By R. S. McBRIDE
Editorial Representative, FOOD INDUSTRIES

A WIDE variety of foodstuffs has been successfully fumigated with several different chemical gases. Perhaps most widely used has been a mixture of one part by weight of ethylene oxide with nine parts by weight of carbon dioxide. This mixture depends for its toxicity on the ethylene oxide, which is a gas at ordinary temperature definitely toxic to all forms of insect life when given in moderate dosage.

Ethylene oxide is used mixed with carbon dioxide for several reasons. First, this eliminates any chance for fire or explosion hazard, which would otherwise prevail since ethylene oxide mixed with air in certain proportions is explosive. In the second place, the presence of carbon dioxide stimulates the respiration and hence the metabolic processes of the insect. This increases the toxicity of the mixture and makes smaller concentrations of ethylene oxide effectual.

A wide variety of foods is subject to insect infestation. Almost without exception these can properly be fumigated. The loss from such contamination is estimated in terms of hundreds of millions of dollars per year by government officials. There is no question, therefore, as to the importance of proper control methods nor of the economic advantage to the food industries themselves.

FUMIGATION of foods may have one or several of the following purposes:

(*a*) To prevent insect development in raw materials during storage.

(*b*) To preserve "form" value of food materals, e.g. nut meats, rice.

(*c*) To protect finished goods from damage during storage either at the factory, during merchandising, or in the home.

(*d*) To protect prestige and valuable trade names which would suffer from even occasional insect contamination.

(*e*) To treat returned goods, preventing contamination of other factory products against the infestation that may accompany returned material improperly cared for in customers' hands.

(*f*) To extend the safe life of package goods, permitting less expensive merchandising or distribution plans that would be necessary if opportunity for insect damage were not eliminated.

In a great many food industries insect infestation is regarded as a necessary evil. This is so serious that in the case of some well-known trade-marked foods, cereals and macaroni, for example, the reputation of the goods has suffered and the losses owing to returned goods have amounted to a substantial percentage of gross sales. Much wider acceptance of the need for fumigation for one or several of the reasons cited is now evident. The main problem is to determine how proper fumigation may be used most economically with 100 per cent certainty as to the results obtainable.

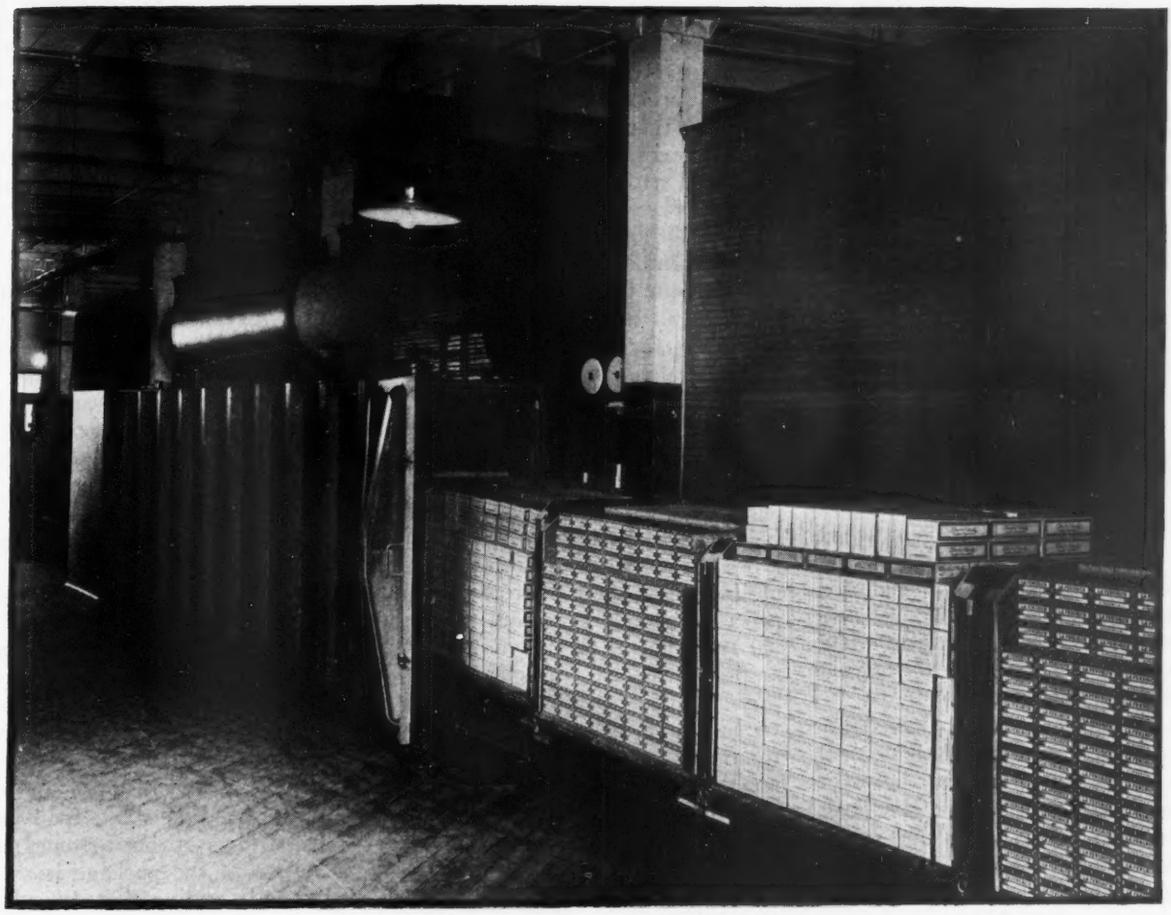
In a few cases careful choice of packages and proper fumigation practice has enabled the re-establishment of markets for certain packaged foods previously thought incapable of safe marketing at certain seasons of the year, especially in the warmer and more humid parts of the country. In at least one instance a packaged product had to be taken from the market because of the difficulty in maintaining vermin-free deliveries to customers. Adoption of gas fumigation has permitted re-establishment of this product and the complete elimination of the insect troubles formerly met.

Fumigation of materials to be used or finished food products should be accompanied by good housekeeping and, if necessary, complete factory fumigation. In general, for the latter purpose cyanide fumigation in the hands of experienced, skilled operators has proven advantageous. It should be emphasized that amateurs should never attempt cyanide fumigation. Even skilled chemists, unless familiar with the technique, should not ordinarily be entrusted with the responsibility for handling HCN gas in general plant fumigation. It requires great care to avoid any danger of fatal poisoning to plant personnel

Cost of Treating Various Commodities

THE following treating costs are based on gas delivered in cylinders of 60 lb. net contents at an exposure period of three hours. These costs are costs of gas and power, but do not include handling of the merchandise into the tank or out of the tank. All of the prices stated below are prices based on lots of 100 lb. of the commodity.

COMMODITY	Cents Per Cwt.
Cereals in bags	2½
Cereals in cartons	2¾
Chocolate coating in bags	2½
Cocoa beans	2½
Dates and figs in cartons	3
Dates and figs in original boxes	3½
Dried beans in cartons	1¾
Dried beans and peas in boxes	1½
Dried fruit in original boxes	2½
Flour in bags	2½
Flour in cartons	2½
Grain in bags	2¼
Nuts (shelled)	2¼
Rice in bags	2¼
Spices and condiments	2½
Tobacco in bales	5
Tobacco in hogsheads	5



A 19-ft. Guardite rectangular fumigating unit in a plant in Evansville, Ind., with a 2½x9-ft. accumulator mounted on top. All vacuum pumping is done by a 10x5-in. Ingersoll-Rand dry vacuum pump. Such a unit is easily accommodated in any plant.

with cyanide. Also real skill is needed for application of cyanide fumigation so that complete cleaning up of a plant is accomplished at minimum cost.

Cyanide fumigation of the foodstuffs themselves is not to be discussed in this article but will be treated specifically in a future issue of FOOD INDUSTRIES.

An insect is killed by a fumigant through absorption of the toxic material. In general this is absorbed by respiration. Toxicity, therefore, is proportional to respiration, or to the metabolic activity of the insect at the time of exposure. In general, the ease with which an insect is killed increases with rising temperature, with increase in concentration of carbon dioxide, or with decrease in the absolute concentration of the oxygen, as well as with the increase in the concentration of the fumigant itself.

All stages in the insect life must be controlled for effectiveness. With many gases the egg is more resistant to fumigants than the larva or the adult. However, ethylene oxide is generally more toxic to the egg than to insects at more advanced stages in their life history. The rate of penetration of this gas is also great, reaching deeply-buried eggs quickly with fatal doses. Consequently when the dosage and time suffice for a complete kill of larvae and adults, it is almost inevitable that all eggs are also devitalized.

NO generalizations are absolutely true for all foods and all types of insects; but, generally speaking, the following statements are useful guides for plant practice:

1. The time of exposure required for a kill of 100 per cent of insects at all stages of life history varies with the kind of material being treated and to some extent with the kind of insect infestation. However, for practical commercial plant purposes treatment for a three-hour interval is becoming standard. The necessary variation to take care of differences in difficulty of treatment is accomplished by varying the concentration of fumigant used.

2. Only when material must be treated at very low temperatures is it usually economic to increase the exposure beyond three hours. However, as previously explained, the factors of temperature, concentration, and time are interdependent. And advantage in one factor, therefore, may either permit or necessitate corresponding changes in one or both of the other variables.

3. Increase in temperature to at least 50 deg. F. is essential; operation at above 60 or 70 deg. is much preferred. Still higher temperature operation permits speeding up of fumigation, but normally this is not warranted when much extra cost is involved in securing the higher temperature.

4. The minimum concentration proper to use in food fumigation depends to some extent on the degree of absorption of the gas by the goods and the containers. Increase in concentration reduces the necessary time and temperature, but not always strictly in proportion.

5. Where limited fumigating capacity will serve for all ordinary purposes, it is cheaper to use a high concentration of fumigant occasionally at the times of peak load than to install more equipment for above normal plant-operating rates if this extra equipment will be used only occasionally.

6. Exactly uniform processing on each fumigating-chamber charge is not essential. Frequently single-shift operation of fumigating facilities is most economical with short-time high-concentration treatments

two times per day and a long-time low-concentration treatment of a third charge over night.

7. The type of package used for holding the material to be treated is generally of no importance under vacuum fumigation. Hence other operating conditions in the plant may be allowed to dictate the size, shape, and character of containers. Only when it is necessary to treat a package which is almost hermetically sealed does it become essential to vary significantly the operating technique.

THE over-all cost, including direct labor, supervision, and capital costs, should be used to determine plans for equipment and schedules of operation rather than minimum costs per operating cycle.

The accompanying table shows some of the types of foods which have been successfully fumigated in commercial plants and indicates roughly the quantity of ethylene oxide-carbon dioxide fumigant which is required per 100 lb. of material treated and the cost.

As explained in the July article, the cost of such treatment varies with many factors. In general, however, the operating expense for chemicals, power, and labor, plus the capital costs for equipment, are not more than 75 cents to a dollar per ton of goods treated. In view of the large savings involved, with the great benefit of improved reputation for clean products that comes from perfect fumigation, such costs are very low compared with the benefits gained in many works. Proper fumigation of packages becomes, therefore, a trademark insurance.

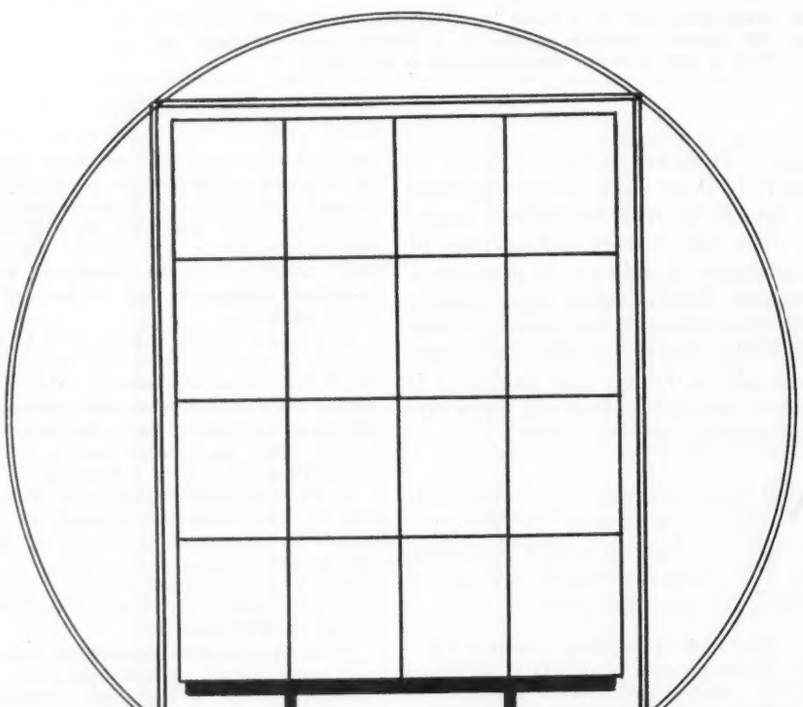
Technique for using ethylene oxide has been so studied that some of the concerns furnishing this material commercially, including equipment for its use in the vacuum process, are able safely to guarantee a 100-per cent kill for every lot treated if the processing is carried out in accordance with instructions.

Extensive experience with various types of goods using desirable fumigating gases show that the vacuum process virtually precludes any residual fumigant in the foodstuffs. With a proper choice of chemicals the presence of such fumigant does not remain in measurable amount after treatment. Apparently in no case yet investigated has the question of residual fumigant been found in any sense a deterrent to this system of fumigation with any of the chemicals except cyanides thus far so employed.

The use of fumigants mixed with a proper proportion of carbon dioxide of course virtually precludes either explosion or fire hazard, even though the fumigants themselves are frequently of flammable nature and potentially explosive when mixed with air without the presence of carbon dioxide.

Packages of virtually any shape or form may be treated by the vacuum process. Occasionally it is even necessary to treat packages that are almost hermetically sealed. In one case treatment of large closed tins of nutmeats was undertaken without removal of the slip-cover lids. Access to the interior by the gas was accomplished through a minute nail hole. Even with this limitation complete fumigation was feasible by the vacuum process; and, using a special technique, this was accomplished without an extension of the time of treatment beyond that normal for the same foodstuffs in containers more easily penetrated.

In only one instance, out of hundreds of types of food packages tested, has it been found that the closure of the package is so near to hermetic sealing that difficulty is experienced. In this one case a slight distortion of the shape of the package occurred when too rapid an evacuation or too rapid a repressuring of the chamber occurred. Even supposedly tightly sealed food containers are not measurably so distorted in practice. Hence vacuum fumigation of foods in finished containers ready for shipment is entirely feasible in practically every case. As indicated above only one single sort of container has yet been discovered which made necessary even a variation in operating technique.



This diagram shows how a skid or a truckload of material stands in relation to a rectangular or a cylindrical fumigating chamber. In the rectangular chamber the maximum loading and output per thousand cubic feet of chamber volume is attained. Also it reduces to a minimum the amount of fumigating gas required to fill the empty space around the load.

OTHER chemicals have been recommended by makers for vacuum fumigation, notably mixtures of methyl formate with carbon dioxide. The general procedure for its use is exactly that which is described above. The quantities required and the optimum conditions of use must be selected specifically for each individual case. Also it should be understood that carbon dioxide mixtures with ethylene oxide can be used in chambers for atmospheric pressure fumigation; but the marked advantages of vacuum treatment usually make the newer procedure advantageous for plants having regular need for such fumigation of materials or products.

The Dumb Housewife Seeks Assistance

She wants to know who really is trying to find out what the food consumer wants, to help the housewife get it, and to protect her against exorbitant and unnecessary prices.

By THE DUMB HOUSEWIFE

YOUR Dumb Housewife has been running around to meetings—specifically, to meetings of the local Consumers Council in one of the larger Southern cities. Having spent so many depression months in her kitchen making intimate acquaintance with the food industry as it affects the housewife—and finding it rather annoying and aggravating in many ways—she decided she would like to know at first hand what her representatives were doing about it.

Being literal-minded she had assumed that Consumers Councils represented consumers, were supposed to find out what consumers wanted, and then try to get it for them; and, of course, to protect against exorbitant prices, or whatever else labor or industry might attempt to put over in their struggles for higher wages and more profits. One of her naive ideas was that their meetings included discussions of possible improvements in processed foods, in packaging, in advertising and in distributing—anything that could be taken care of by legislation or codes. Certainly, in view of the alarming upward flight of butter and meat prices because (everybody said) of the drought and not, of course, because of curtailed production, the Council representatives from Washington would make some report as to what the Council was doing to keep prices within the purchasing power of the housewife.

At the first meeting attended, the charming young woman from Washington was scheduled to speak on "Labels"—and she did. More specifically she spoke on the A.B.C. labeling plan which, she said, had first been a part of the original Tugwell Food and Drug bill, and later was proposed for the canners' code. It was quite evident that bringing up any other subject for discussion would be considered entirely out of order. It was even more evident that any adverse criticism of the grading plan would be treason and heresy, and the individual making it would be a traitor to the consumer, to the New Deal, to humanity; and undoubtedly in the pay of the wicked food industry.

Not that anybody was rude or disagreeable. The meeting was conducted with easy Southern courtesy, not unlike the velvet touch of a kitten's paw. The speaker's sincerity was obvious. She was convinced of the rightness of her cause—and the depravity of her opponents. (She did mention, as one encouraging symptom in an otherwise impenitent industry, that she had been told some of the manufacturers would like to do something for the consumer in the way of better labels and laws for the purchasers' protection.) She gave the impression that her comrades in Washington were equally sincere and earnest, that they felt they were on a modern crusade, and that they were having a rattling good time fighting the heathen industrialists.

AT a later meeting addressed by a representative of the Department of Agriculture, this impression was strengthened. Again the meeting was simply part of an educational campaign devoted, this time, to the government grading of meat. The rising price of meat was mentioned only once, by a local market executive, and gently passed over as not being germane to the subject under discussion.

Now, the Dumb Housewife wants to know who *is* looking out for the consumer?

The executive secretary of what should be her own representative organization, the Consumers League, was the guest speaker at another meeting in the same city and her subject—again crusade might be a better word—was devoted to shorter hours and higher wages for labor!

Giving due consideration to the necessity for a living wage and the desirability of luxury wages, it would seem logical that a consumers' organization would realize that the consumer must pay these increased wages in higher prices, and would be making some effort to offset the activities of the powerful labor organizations, in order to keep the proper balance between prices and consumer purchasing power.

Is there nowhere any organized realization of the fact that the average consumer's income these days is pretty nearly a bare "living income" and that consumers and labor are actually opponents in economic adjustments? If all housewives were the wives of industrial workers, it might be simply a harmless circle; higher wages, higher prices, more consumer purchasing power, and no one would be either better or worse off, except that all possibility of exporting products to lower-paid foreign consumers would disappear if the process was carried too far.

THE Dumb Housewife has lived during the last few years in a depression-staggered fashionable suburb, in a poverty-stricken city of

white collar workers, in a New York farming section and in the rural South. Everywhere she has found the housewife obliged to look closely to her food costs. While only luxuries disappeared from the tables of those who still have a sufficient income, all too many women face the problem of stretching their incomes to cover the bare necessities of a balanced diet. It is for these worried, hard-working, inarticulate women that the Dumb Housewife asks help.

Retrogression to the winter diet of our pioneer ancestors, starch in some form, made palatable with something sweet, is the natural temptation. Our hardy, outdoor-working ancestors usually managed to get through the winter on this basic diet, with taken-for-granted twinges of rheumatism and a generally bilious condition, requiring liberal doses of sulphur and molasses when the last wrinkled apple had been eaten and just before dandelions and other greens appeared in the spring. What effect this diet will have on city and town dwellers need not be gone into, nor is there any necessity of pointing out to the food industry its effect on their business.

Naturally, farmers, farm workers, business people living in country, towns and villages—every thrifty family with a spot of ground, is going in for gardens, and the housewives are going back to home canning and preserving. Much of the food industry that has been coaxed and prodded out of the home is, perforce, drifting back into the home.

EVEN if the food industry is as selfish and greedy as the Washington crusaders seem to believe, that same selfishness should counsel some championship of the consumer. The Dumb Housewife would like to see an analysis of the various consumer groups. The luxury group, the industrial workers, the small business men in industrial centers largely dependent on the industrial workers' patronage; farmers, farm labor, and the rural business dependent on the farmer; not forgetting the fixed income group, non-workers dependent on savings, pensions, and life insurance. With the recent drift from the cities, it is probable that just about half of the population belongs in the rural group, and more than half in consumer importance when you consider industry's and the urban business man's needs of their purchasing power.

Now the thing that has puzzled the Dumb Housewife more than anything else in this present sea of economic argument, is how the $1.25-a-day farm hand can be expected to buy the products produced by the higher paid industrial laborer—and how he is going to like working from eight to twelve hours a day for his $1.25, when the other man works only six hours, five days a week, for at least three times as much? If the already hard-pressed farmer is to be forced to increase wages and reduce hours competitively, where is his solvency and purchasing power going, and where will the prices of food have to go? How would high wages and short hours benefit the industrial worker? How could any of this high-priced food be exported?

If this country couldn't exist half slave and half free, how is it going to exist on $1.25 in agriculture against, say, $10 a day in industry? Purchasing its raw material from the farmer and dependent on all classes of consumers for its market, it would seem that no other group of business men in the country has the incentive as well as knowledge of these problems and possible solutions, that the food industry has, or should have.

WHATEVER may be the merits of government grading and control of food products, it won't put money in the housewife's pocketbook with which to buy proper food for her family. As an indication of where the practical housewife stands as between crusades for idealistic theories and the practical dollar-and-cents feeding of her family, the attendance at these meetings should be fairly indicative. The two Consumers Council meetings attracted audiences of 20 to 30 people almost all professionally interested. In contrast, a three-day demonstration of meat selection and cookery, held in a theater in the same city, during the worst snow and sleet storms of the winter, turned away hundreds of women every day for lack of seating capacity. The Dumb Housewife cannot report on the drawing power of these meetings—she was one of the hundreds who arrived too late.

Paid and Spent:

Three-Quarter Billion in Processing Taxes

PROCESSORS of agricultural products had paid in to AAA up to April 1 almost one and one-half million dollars in excess of expenditures for rental and benefit payments and surplus removal. The government's total expenditures in its program to rehabilitate the agricultural industry totaled $776,103,578, of which $33,833,107 went for administrative expense. Total receipts from processing taxes amounted to $777,-540,894.

Food manufacturers, of course, did not contribute all the funds to finance this program, the tobacco and textile industries paying a lion's share. In order of the magnitude of their contributions the industries are meat packing, textile, wheat products, sugar, tobacco, paper and jute, corn products and peanuts.

The dairy products industry paid nothing in as processing taxes, but the government spent $10,958,431 in removal of surplus dairy products.

The accompanying table compares government expenditures by agricultural product with the processing taxes paid in by food manufacturers.

Processing Taxes and How They Were Spent

(Cumulative to April 1, 1935)

Commodity	Income: Processing Taxes Paid	Expenditures: Rental and Benefit Payments to Farmers	Expenditures: Expenditures for Surplus Removal
Wheat	$212,546,669	$162,444,856	$6,097,239
Corn	9,783,598	253,536,280	46,081,425
Hogs	227,576,411		
Sugar	48,459,991	6,256,933	365,536
Peanuts	1,829,189	.....	350,911
Dairy Products			10,958,431
Cotton	219,116,924	224,962,539	.....
Cotton Ginning[1]	666,336	.....	.....
Paper and Jute[2]	11,935,120	.....	.....
Tobacco	42,494,098	31,216,317	.....
Total	$777,540,894	776,103,578	

[1]Tax under Bankhead Cotton Control Act. [2]Compensating taxes.

Wrapping Tomatoes

Material used affects ripening, color, keeping qualities and absorption of odors and flavors

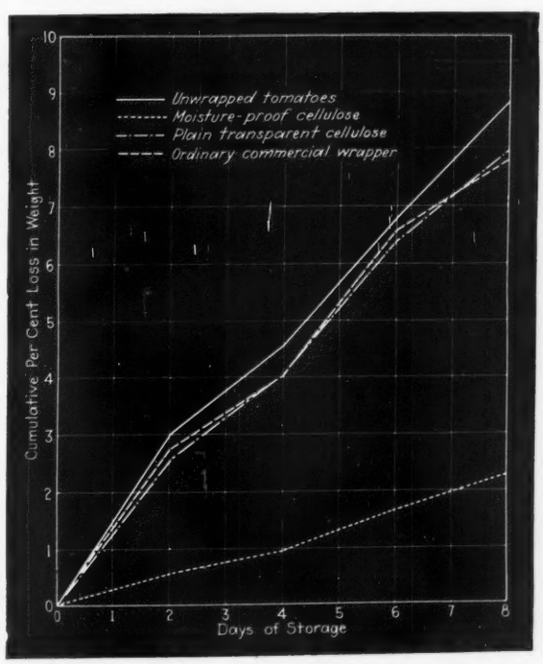
By
JOSEPH D. CARUSO
and
R. B. HARVEY

Laboratory of Plant Physiology, Department of Plant Pathology and Botany, University Farm, St. Paul, Minn.

Constant temperature room at University Farm, St. Paul, Minn., where work on tomato storage was conducted.

HANDLING of tomatoes in transit and storage is one of the most difficult problems of the fruit jobber. In 1929 the freight claims paid by the railways for damages on the shipment of cars amounted to $1,011,857, or an average of $31.90 per car. This average loss exceeded that of any other vegetable product. More than other fruits, the flavor of fresh tomatoes is dependent upon proper transportation and ripening. Since salad tomatoes usually are not peeled, the appearance of small blemishes must be avoided. The presence of small spots of bacteria or fungi influence greatly the flavor of the whole fruit and its appearance. The present unsatisfactory condition of the tomato trade in winter has led to the studies reported and discussed here.

In the long transit from the growing districts of Florida, California and especially of Mexico, a bacterial soft rot caused by *Bacillus carotovorus* may destroy a large percentage of the tomatoes. In cars with even relatively small percentages of tomatoes infected with soft rot, there is given off such an obnoxious odor that the flavor of all the healthy tomatoes is made objectionable. Furthermore, the soft rot spreads rapidly by the dripping of the infected juice over the healthy fruit. In the process of decomposition, volatile and odorous compounds are formed and, if the percentage of decomposing fruit approaches 10 per cent, the contents of the entire car is so affected as to become unsalable. When 10 per cent of the carload is infected by soft rot, workmen refuse to unload the shipment, since the odor is intensely nauseating. The odor is very persistent and can be tasted in healthy fruits for more than a week after the lugs of healthy fruits are removed from the car and aerated. Upon receipt of such a car, the only recourse is disposal by dumping. Naturally, such losses are reflected in the price.



Relative cumulative per cent loss in weight of tomatoes in various wrappers held in storage at 24 deg. C. (75 deg. F.)

Tomatoes, more than most other fruits, readily absorb foreign odors on the wax of the skin and the odor penetrates within the flesh of the fruit. Stem scar fungi (*Phoma sp.*) impart a characteristic musty, fungus odor and taste to the whole fruit. It was found that gasoline vapors, motor exhaust gases, illuminating gas, onion flavor, fungus odors, etc., are effective in reducing the palatability of the tomatoes if contact is made at any time in transit or storage. Certain pasteboard boxes are unsatisfactory because of the odors given off, depending on the humidity and storage conditions, since the packing boxes become wet from the drip from rotting fruits or condensed moisture. Certain wrappers used in the trade have objectionable effects on flavor.

A wrapper that would remove or minimize the above enumerated waste factors was sought. Those considered were (1) the ordinary plain paper wrapper used by the tomato trade, (2) moisture-proof transparent cellulose, and (3) plain non-moistureproof transparent cellulose. Tomatoes wrapped in these and an unwrapped check for comparative purposes were subjected to conditions similar to those encountered in commercial practice. In all instances the healthy fruit used in these comparisons was disinfected by washing for five minutes in a 4 per cent dilution of a saturated chlorinated-lime solution prepared by the methods recommended for disinfection. The following factors were determined:

1. Relative loss in weight.
2. Ripening under cool storage and room conditions.
3. Effect of wrappers on ethylene ripening.
4. Transfer of flavors through wrappers.
5. Effect of wrappers on storage life.
6. Transfer of odor in shipping boxes (paper carton).

Fruits from the same shipment and free from visible infection were used to assure comparative results.

Relative Loss In Weight. Tomato fruits normally transpire considerable quantities of water from their surfaces which will lead to shriveling, especially if no provision is made to decrease transpiration in the grocery by refrigerated storage or under spray-cooling devices.

To determine the relative loss in weight of tomatoes in the various wrappers at ordinary room conditions, four baskets of 25 tomatoes each were used. The baskets were the common split-wood type of the tomato trade and held from 5 to 6 lb. of tomatoes. At intervals of two days the fruits were quickly unwrapped and weighed.

The moisture from tomatoes in the moistureproof wrapper was not able to vaporize through the wrap and into the air. It collected in beads of moisture on the inside surface of the wrapper. This condition will lead to rapid spread of bacteria and fungi on the surface if unsterile tomatoes are used. The non-moistureproof cellulose became soft and moist, but it permitted the moisture to volatilize through the wrapper to a greater degree than did the moistureproof variety. There were no visible effects of moisture on the plain paper wrapper. Evidently the moisture escaping from the tomatoes passed through it easily.

The moistureproof transparent cellulose cut down the weight loss to one-quarter the amount of that of unwrapped tomatoes. Its superiority for this purpose is evident. The non-moistureproof transparent cellulose and ordinary paper wrappers did not have such a decided effect on the moisture loss.

Ripening Without Ethylene. Tomatoes in the various wrappers and unwrapped checks were ripened in a room held at 24 deg. C. After four days there were distinct differences in color. Those wrapped in moistureproof transparent were decidedly riper than the others. This may be attributed to the retention of carbon dioxide or other gases within the wrapper. From this fact and recent data of Gane (1) and Nelson (2) it appears that unsaturated hydrocarbons may be produced in the ripening process. The ripening fruit, itself, may produce substance similar in effects on ripening to ethylene, which, if held in by the wrapper, hasten the ripening process. After six days the order of ripeness did not change. There was little difference between the ordinary paper wrap and the check in ripeness.

Wrapper	Order of Ripeness 4 Days	6 Days
Moistureproof transparent cellulose	1	1
Non-moistureproof transparent cellulose	2	2
Ordinary Paper	3	3
Check (unwrapped)	3	3

Ripening With Ethylene. Four lots were subjected to an atmosphere containing one part ethylene to 1,000 parts of air according to the usual commercial practice given by Harvey (3). The fruit was permitted to establish a humidity by evaporation into the small ripening chamber to equilibrium. Inspection at four and six days showed no marked difference in the relative rate of ripening of the lots. All were within a shade of the others in color with those in commercial paper wraps slightly in advance. Ethylene evidently diffuses through the wrappers and there is no excessive absorption by the moistureproof transparent cellulose.

In comparing the rates of ripening with and without ethylene it was evident that those ripened with ethylene were much in advance of those ripened in air. The most advanced of the fruits matured at ordinary conditions were far behind the least-colored lot of those treated by the ethylene method.

Actual and Cumulative Per Cent Loss in Weight of Tomatoes in Various Wrappers

(24 deg. C)

	Unwrapped Tomatoes		Non-Moisture-proof Transparent Cellulose		Ordinary Paper		Moistureproof Transparent Cellulose	
	Weight (gm.)	Per Cent	Weight (gm.)	Per Cent	Weight (gm.)	Per Cent	Weight (gm.)	Per Cent
0 Days	2,842	0.00	2,163	0.00	2,439	0.00	2,395	0.00
2 Days	2,757	2.99	2,104	2.72	2,376	2.58	2,382	0.54
4 Days	2,714	4.50	2,076	4.02	2,340	4.06	2,373	0.92
6 Days	2,649	6.78	2,025	6.38	2,289	6.56	2,356	1.63
8 Days	2,591	8.83	1,991	7.95	2,249	7.89	2,341	2.25
Relative Loss	....	100.00	.....	90.10	....	88.50	....	25.50

Transfer of Flavors. Air was passed over tomatoes in a bad state of decomposition from controlled inoculation with *Bacillus carotovorus* and led into a chamber in which were four baskets of tomatoes, including a check and three wrapped lots. It was desired to see if the volatile constituents given off by the decomposing fruit would impart a foreign odor to the experimental tomatoes. After eight days the following data was obtained by a tasting squad. It was noticed that upon slight aeration the extent of the odor decreased rapidly. Evidently much of the obnoxious odor is given off by the surface relatively quickly.

Wrapper	Odor
Moistureproof transparent cellulose	Negligible
Non-moistureproof transparent cellulose	Strong, musty
Ordinary Paper	Fairly strong, musty
Check (unwrapped)	Negligible

Since the odor disappeared quickly from the check, it was evident that any lasting odor, after aeration, may be due for the most part to the absorption of the odors given off by the wrapper and absorbed by the wax of the fruit.

On cutting the tomatoes after the odor tests, a tasting squad found that those wrapped in moistureproof transparent cellulose, in commercial paper, and the unwrapped check had an untainted taste in the body of the fruit, but some fruit had a musty and lasting taste when the skin was chewed. The non-moistureproof transparent cellulose had a serious effect on the taste. A long-lasting putrid taste was noted. These wrappers tend to soften in air of relatively high humidity. This can be ascertained by wetting the wrapper with the tongue. The taste obtained in this way is characteristic of that imparted to the fruit under ordinary conditions.

It seems from this that the objectionable taste may be due as much to the malodorous moist wrap as to the volatile constituents coming from the rotting fruit. What we ascribe to taste may really be odor which evidently is absorbed mostly by the tomato peel.

Effect of Wrappers on Storage Life. The tomatoes were sterilized and set up in lots with the various wrappers and stored at a constant temperature of 5 deg. C. After four weeks the moistureproofed lot was the ripest. It was followed closely by the check, while those wrapped in the ordinary commercial paper and in non-moistureproof transparent cellulose were still green. The same relative effect was maintained in the fifth week, but signs of stem fungus growth and some soft rot appeared.

Those wrapped in moistureproof wrappers were firm and in fine shape after four weeks' storage, but they began to fail in the fifth. They were the most advanced in ripeness with an even, red color.

The check was next in order of ripeness. In three weeks the tomatoes began to get soft and had rotted spots. This was probably due to contamination from the air. In five weeks they were not edible.

Those in the paper wraps were in varied state of ripeness. The majority was still very green, with one-half of the total lot infected with stem end *Phoma* rot and soft rot (*B. carotovorus*).

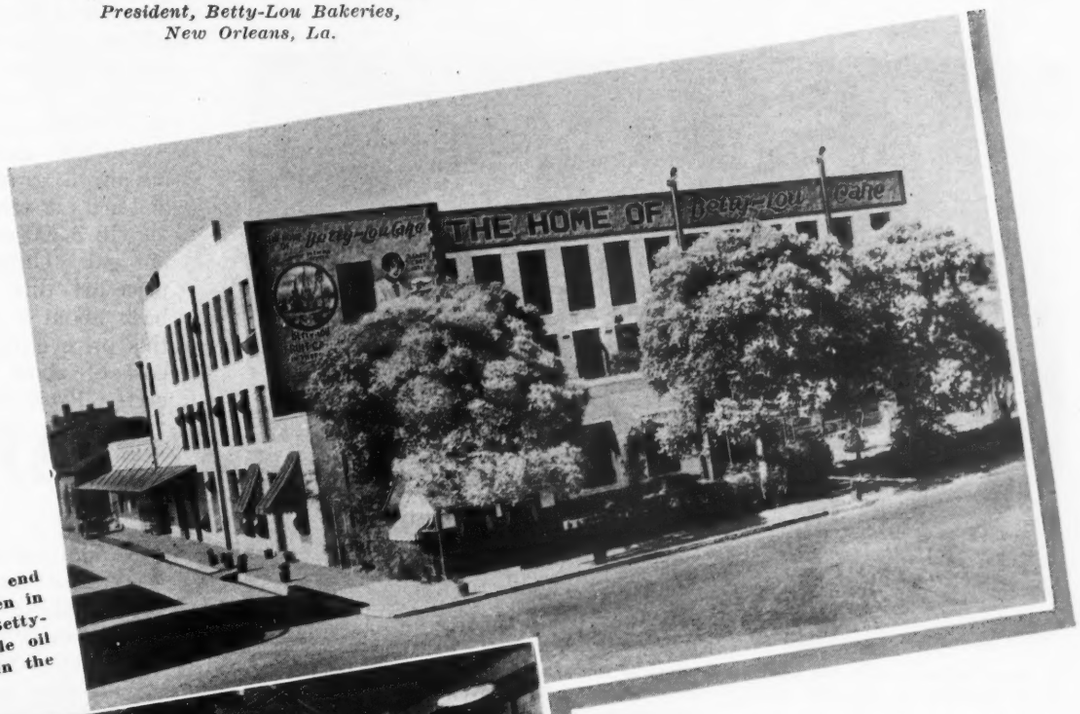
Non-moistureproof cellulose wrappers kept the fruit in a light green condition. One-

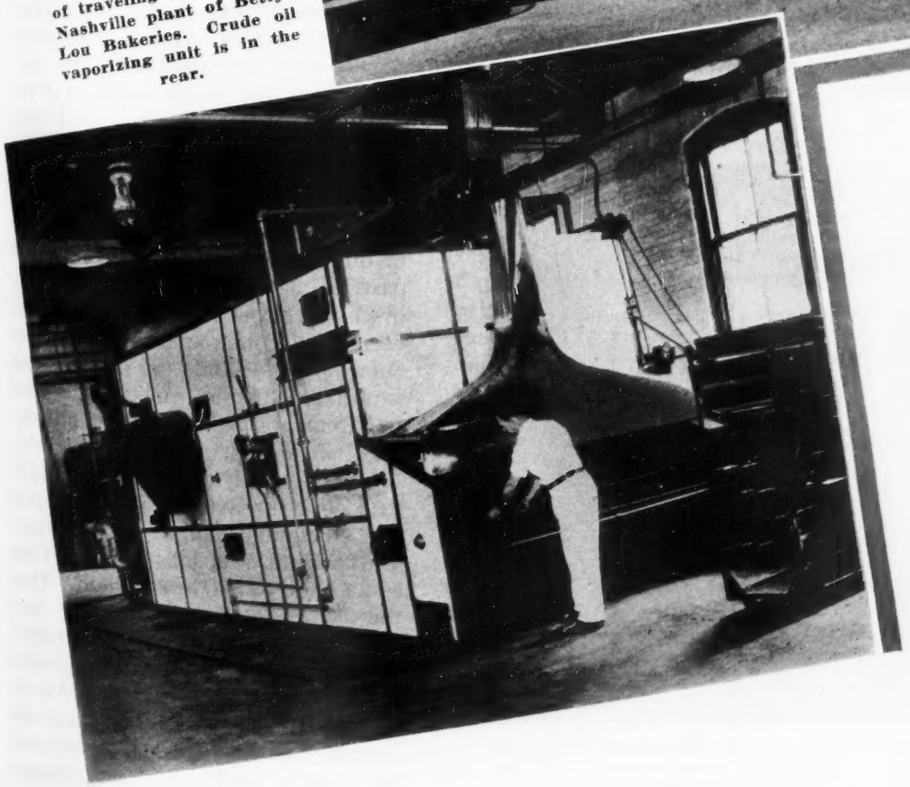
(Turn to page 416)

Cutting Fuel Cost in Half

Installation of vaporizing unit reduces bake oven fuel expense from $400 per month for utility gas to $200 per month for fuel oil. There were other savings also as the production capacity of the oven was materially increased due to more effective heating.

By GEORGE E. PEREIRA
President, Betty-Lou Bakeries, New Orleans, La.





Loading and delivery end of traveling tray oven in Nashville plant of Betty-Lou Bakeries. Crude oil vaporizing unit is in the rear.

OIL as a fuel for bake ovens, steam boilers, roasters, and the like was not at all a new industrial idea more than a year and a half ago when we, like many other food manufacturers, were seeking ways of cutting fuel expense in our efforts to reduce production costs. However, the use of fuel oil vaporized to the extent that it can be premixed with air, piped, and burned like natural or manufactured gas was new—to us at least.

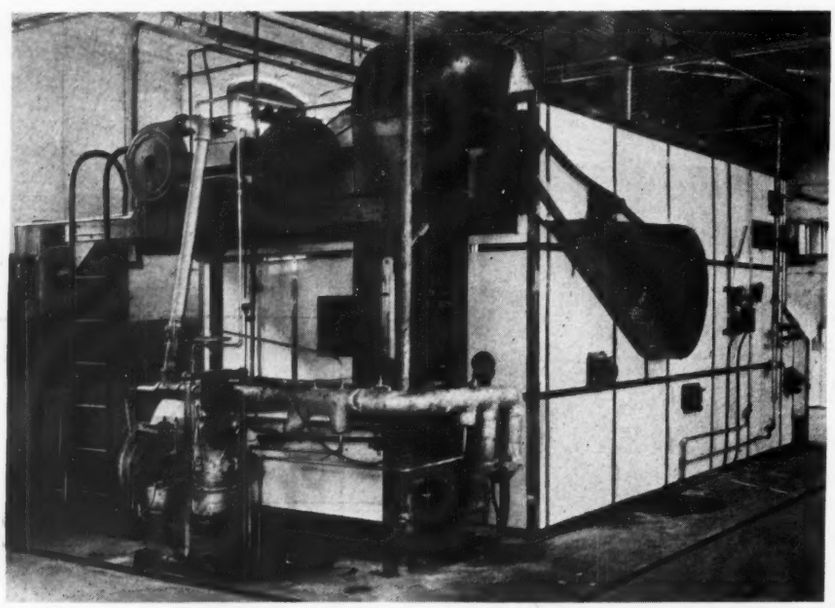
After inspecting such a vaporizing installation in operation we decided to give one a test in our Nashville, Tenn., plant. In this plant the Betty-Lou Bakeries has a Petersen traveling tray oven fired

with a Furkert recirculating unit heater. This oven has a capacity of 2,500 to 3,000 loaves of bread per hour. It formerly was fired with city gas (440 B.t.u. per 1,000 cu.ft.) at an average cost of approximately 65 cents per 1,000 cu.ft. Also in this plant are two 16-ft. diameter Fish rotary ovens fired through a combustion chamber located in the rear of each oven. These too used city gas.

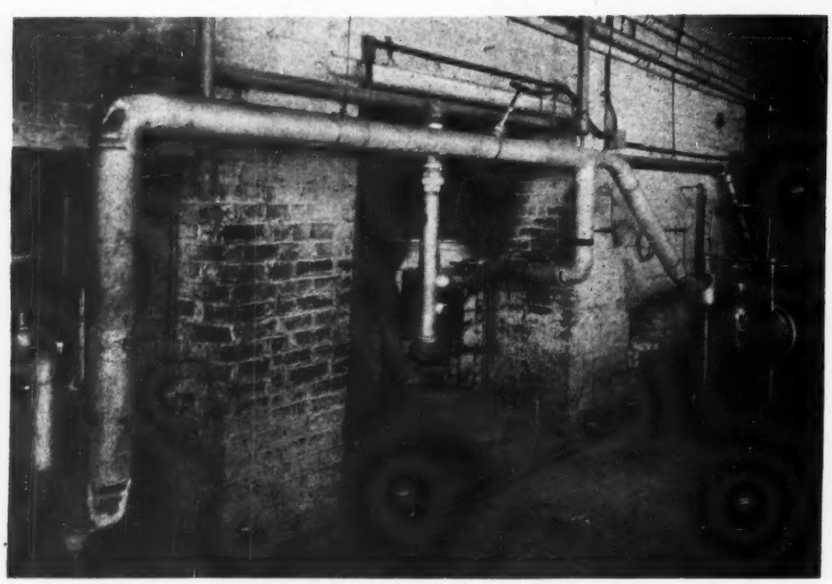
The Petersen bread oven was equipped with automatic temperature control and with the usual safety devices. Consequently when the oil vaporizer was installed next to the reciprocating unit heater it was interconnected with the same automatic temperature controls and safety devices. This unit, manufactured by the Vapofier Corp., Chicago, Ill., is relatively a simple installation which converts the fuel oil into a gaseous state and premixes it with air so that it has all the characteristics of a rich gas. It requires a floor space of only about 6 sq.ft.

The Fish rotary ovens are being used for baking cakes and pastries and are fired with two nozzle type burners in the rear of each oven. One burner is considerably larger than the other. In this way both burners can be fired for quick heats or the one large burner for most of the baking and the single small burner used to hold temperature in the oven. A single vaporizer unit was installed to furnish gas to fire both ovens. The ovens are still controlled by opening and closing the valves on the burners or shutting off a burner not required; the same as they were with city gas. The vaporizer has a diaphragm control device which automatically regulates the supply of gas and air to meet the demand of the burners to reach and hold the desired temperature.

The fuel used is No. 1 furnace oil having a gravity of 38-40 Baume and a B.t.u. value of 138.000; equivalent to 3,200 cu.ft. of 440 B.t.u. gas per gal. Until recently the average price of this oil in Nashville has been about 8 cents. We find that this price is equivalent to a city gas cost of about 25½ cents per 1,000 cu.ft. From this, it is seen that our fuel saving, worked out on an equal B.t.u. basis, was just about 60 per cent.



A diaphragm control automatically regulates the supply of gaseous oil and air to meet demand of burners. Rear view of traveling tray oven showing vaporizer installation.

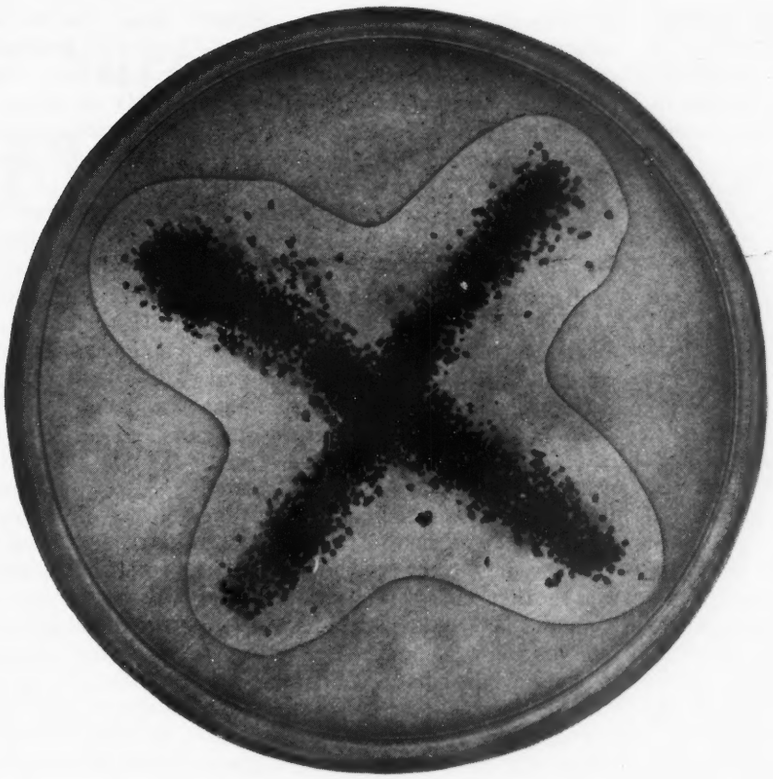


Two nozzle-type burners in the furnace of each rotary cake oven permit the use of both burners for quick baking; the larger of the two for most purposes; and the smaller for holding the oven temperature. A single vaporizing unit supplies the oil-gas for two 16-ft. diameter ovens.

IN addition to this saving in fuel expense an examination of the bread baking operations show that our capacity has been appreciably increased because we can bake more rapidly than we could with city gas. The crusts are much more uniform in color and are softer and the bread, itself, is even better than the former high quality always turned out by Betty-Lou Bakeries.

The products of combustion come in direct contact with the cakes and pastries baked in the Fish rotary ovens. To our surprise there have been no contaminating odors or fumes of any kind. In addition, the vaporizer unit has met all heating requirements, although one unit supplies two ovens.

The cost of the installation was $1,425. Our average gas bills were in the neighborhood of $400 a month. Our present fuel bills (oil bills) are about $160 to $200 per month. Thus the complete installation has been written off in about seven months' time and as the installation was made in January, 1934, we have had a net saving of more than $2,000 since the installation was made. Furthermore, all standby and commodity charges are eliminated.



This test has been used to demonstrate how silver in the form of Katadyn sand will prevent bacterial growth. A Petri dish containing a bacterial culture into which has been sprinkled the Katadyn sand in the form of a cross. In the clear area around the sand bacteria have been unable to grow.

Katalytic Oligodynamics

["*Katadyn*" *To You*]

By HALDANE GEE
New York, N. Y.

CONVENTIONAL disinfectants and sterilization procedures have been threatened with new competition by a revolutionary method introduced from Europe last year. The new system involves the addition of silver ions to the liquid undergoing treatment, which is said not only to kill bacteria but also to confer antiseptic properties. Claims advanced for the "silvering" equipment are in some respects amazing. Examination of the principles involved indicates, however, that there may now be in sight vital technical applications of a mass of fundamental research on metallic germicides which has been accumulating in scientific literature for 40 years. Commercial installations for water treatment have already met with sufficient practical success to offset some of the obvious theoretical objections to the system of sterilizing.

Concerns handling foods will encounter the device in the immediate future under the trade name "Katadyn," a combination of the words katalytic and oligodynamic, which two effects are said to be responsible for its efficacy. The latter phenomenon dates back to the discovery in 1893 by Naegeli, a botanist, that inconceivably small quantities of copper will hinder the growth in fresh water of the filamentous alga *Spirogyra,* a common inhabitant of fresh water known also as pond scum. Naegeli satisfied himself that the water became toxic to *Spirogyra* if a copper plate were merely immersed in it and then removed. Present-day copper-sulphate treatment of natural waters may date from this experiment. Effective quantities of copper were so small that they could not be determined by the analytical methods available at the time of the discovery. Silver and mercury were later found to possess similar properties, with the range of susceptible single-celled organisms extended to include yeasts and bacteria.

The term "oligodynamic" does not involve elaborate thermodynamics but was selected as a description of this long-established lethal effect of certain metallic ions on protoplasm. The catalytic action, covered also in the trade name "Katadyn," includes the observation that, once available, the metallic ions render the liquid containing them "active," and capable of killing bacteria which may afterward be introduced, either intentionally in experiments or accidentally as encountered in commercial operations.

Practical applications of the phenomenon began to appear at the close of the World War, when a successful container was reported, based on the katadynamic effect of silver, for safeguarding supplies of drinking water for armies in the field. Credit for this invention goes to Prof. G. A. Krause, of Germany, subsequently associated

with numerous commercial applications of "Katadyn." Installations in public water supplies in particular have occasioned scores of reports in clinical, engineering and public health periodicals.

Reports have come to this country to the effect that Katadynized water has been adopted in numerous European swimming pools in the past two years, and among current industrial uses abroad are for bottle washing and plant sterilization, and for the treatment of butter and vinegar.

SILVER may be added in either of two ways under the patented system. The "contact" method may use a granulated silver, so prepared that one gram of the metal possesses 1.62 square meters of surface, or alternatively, silver-coated sand may be used in filters in conjunction with other layers of colloidal material. In the other scheme, the necessary quantity of silver is introduced electrolytically. A unit for treating swimming-pool water, for example, is contained in a short casing with flanged ends which is inserted in the regular pipe lines. Inside the casing is a deck of thin silver plates which serve as electrodes, with no distinction between anodes and cathode needful. Reversal of the current across the plates at regular intervals prevents the clogging of the electrodes with slime and confers a self-cleaning feature.

Silver and electricity consumption are both minute. A factory-size unit takes no more current than a domestic radio set, with the electrolyzing voltage held below 1.65 volts, preventing decomposition of the water. Silver ions pass into the water at the theoretical rate of 4 grams for each ampere-hour, but in practice the efficiency achieved is 50 per cent.

Concentrations of silver found successful, it is asserted, are not prohibitive by reason of expense, and the dearer metal is declared to be 60 times as effective as copper. Treatment of drinking water with 0.05 milligram of silver to the liter is said to cause death of bacteria after the Katadyn water has stood for a brief interval. Other liquids, as vinegar, may require considerably more per liter in some cases. The silvering rate for a commercial unit can be quickly calculated from the rate of liquid flow, the strength of the electrical current and the current efficiency of the liquid.

The first commercial unit in the United States was placed in 1934 in the swimming pool of the Congressional Country Club, at Washington, a development which has been closely followed by sanitary authorities. Advantages claimed for Katadyn for bathing water, or for numerous other uses, include freedom from odor, taste or altered appearance, and the avoidance of heat or chemical treatment. Installations available range from one of pocket size to equipment for a city waterworks. Though silver consumption is low, it would seem, however, that wholesale applications are not indicated. One rough estimate, as yet not confirmed, gives the expense of chlorinating a water supply at one-fiftieth the cost of Katadyn treatment. In other localities the cost of treatment of drinking water varies from the same cost to nine times the cost of chlorine treatment, depending on local conditions. The food industry will likely be more interested in possible applications to some finished products, as wine and vinegar, than to unlimited quantities of process water.

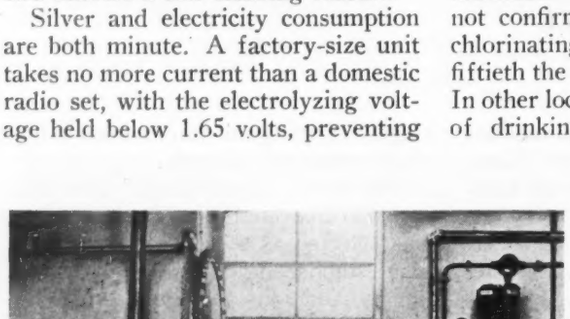
Katadyn treatment is reported to be superseding the pasteurization of vinegar in Europe, with 70,000 liters of the product receiving silver each hour in France, Germany and Switzerland, and German factories are washing 120 tons of margarine a day with Katadyn water.

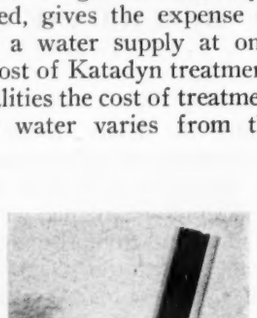
THE amount of metal in Katadynized drinking water is said to be relatively less than is ordinarily transferred to food from silver knives and forks, and is also said to be without objection in view of the extensive use of the metal in dentistry. Incidental uses for which Katadyn water is advocated are the preservation of cut flowers and the restraint of algal and slime growths in aquariums and plant equipment, particularly Baudelot coolers. It is mentioned also as the answer to the historic problem of conferring bacterial safety on sacramental usages and other religious rites, including protection of holy and baptismal water and the safeguarding of the common communion chalice.

Bacteriological appraisals of the process to date indicate that it is most successful with clear liquids, turbid ones requiring some clarification. The efficiency of the method falls when bacterial counts are high. Pathogenic organisms appear more susceptible than the usual flora of air and water.

Theoretical objections to the process are numerous. Various bacteriological investigations have shown that traces of rare or heavy metals, usually considered toxic in greater quantities, may favor bacterial activity in minute quantities. Furthermore, it is not clear what happens to the silver ion in a liquid already containing a complex metallic mixture. Yet the sponsors treat sea water for bathing pools, claiming results in one of the most complicated of common liquids. Questions of pH and temperature must doubtless be considered in all cases. And the further question arises whether equal results could not be obtained by the addition of equivalent amounts of silver salts.

Reports on the equipment vary widely. Despite its limited theoretical background, it has been viewed in some quarters as a sensation. Food experts will follow its progress closely.





Units similar to one shown on left are available for installation in dairy, packing, beverage and other "wet-process" food plants. Pathogenic germ-free water is produced in about an hour by small portable unit on right after a 20-second immersion.

Surface and Tallowy
Flavors of Butter

By F. W. BOUSKA
Beatrice Creamery Co., Chicago, Ill.

THE HIGHER a position the greater the possibility of a fall. The higher the flavor of butter the greater the possibility that it will decline. That does not mean that good butter becomes poor butter sooner than mediocre butter. It means that it is difficult to retain the high peak of flavor. It seems that delicate flavors of many foods are unstable.

Description of butter flavors is not a simple task. "De gustibus non est disputandum." Resort to chemistry is only somewhat better. Many chemists speak on the subject but nearly all generalize to excess. They are obsessed to make one master test and this is to register all the many flavor defects. Rancidity, in the older chemists vocabulary, covers a multitude of sins. Unfortunately, few chemists agree on these crucial tests for flavor reactions.

All the constituents of butter, namely, fats, casein, albumin, lecithin, sugar, and lactic acid are subject to change. A change in a constitutent usually produces a change in the flavor of butter. Butterfat is susceptible to two genera of transformations, analytic and synthetic. Rancidity, as known to the butter trade, is a splitting process. Tallowiness is an oxidizing, that is, synthetic process.

All butter of commerce, be it in tubs, prints or rolls, develops an off flavor on the surface in a few days. This can be ascertained by tasting a bit of butter carefully removed as a very thin shaving from a long exposed surface. If other fats are examined with the same scrutiny the same flavor will probably be found. The flavor is unpleasant and may be described as woody. As the butter becomes older, the flavor may be described as tallowy. Not often, this flavor develops rapidly, is very disagreeable, and very much resembles old tallow. Rarely the creeping of the tallowy flavor is accompanied by bleaching, the surface changes from yellow to white. In severe cases the change in flavor and color is simultaneous. I have known it to occur over night. The transformation in such butter is so great that people think it is not butter but a foreign fat.

CONSIDERED from the standpoint of frequency and volume of butter affected, oxidation of butter appearing as mild surface flavor to pronounced tallowy flavor, is the most important deterioration today. It affects all grades and types of butter.

Prevention by protection against air readily comes to mind. In practice, butter should be wrapped and covered. Use of metal foils and other air-tight coverings has been only partly successful. These retain so much moisture that molding becomes troublesome. Packing in tin cans under vacuum is very promising but appears expensive for ordinary trade.

The effect of anti-oxidants is interesting experimentally. Although light greatly accelerates oxidation of fat, butter is seldom exposed to light long enough to give reason for much alleviation by farther protection against light.

More important is the catalyzing effect of metals like copper and iron. Very small amounts of these metals cause rapid development of tallowiness. Some of the worst cases of tallowiness are due to this cause. Milk, cream and butter should be scrupulously protected against copper and iron. That is, rusty or detinned equipment is a very detrimental contamination.

The reaction of the butter is very important. Butter testing pH 6.0 to pH 7.0 holds its own very well, although pH 7.0 is a little lacking in acidity and pH 6.8 is better. At pH 7.0, butter has more tendency to surface flavor; and at more alkaline points, say pH 7.2, 7.4 and 7.6, tallowy flavor develops soon and is very bad. Such butter may develop the flavor of cheese or old cheese, and may become very offensive. The curd of butter is preserved by lactic acid. When this acid is absent the curd putrefies. This affects flavor directly and it also accelerates oxidation of fat. At the other extreme, when butter is more acid, say pH 6.0, there is a tendency to poor keeping quality. This becomes more pronounced as the acidity increases and at high acidities metallic, woody, and sometimes fishy flavors occur. This is due to transformation of fat.

Heat accelerates and cold retards development of tallowiness. However, if the butter is appreciably contaminated with copper or iron or distinctly alkaline, no amount of freezing is sufficient to delay tallowiness long enough for practical purposes.

MANY investigators have studied the relation of microorganisms to flavor of butter. In Canada, there is a strong belief that microorganisms cause surface flavor. According to my observations in the United States, the reaction of the butter has affected the development of bacteria and thus the flavor. Every year I see several cases of neutral or alkaline butter in which typical flavors develop. This may be butter made from sweet cream with no neutralizer added or from sour cream neutralized too low.

Oospora lactis (Oidium), the white milk mold, is indigenous to all dairy products and it feeds on acid. It usually grows on the surface because it needs air. In time, it consumes enough acid to release the growth of putrefying bacteria which then develop cheesy and other flavors and tendency to tallowy flavor increases. As mentioned, a neutral or alkaline reaction accelerates oxidation. Thus the development of an unpleasant flavor on the surface is the result of several factors.

Briefly stated, safeguard against contamination from iron and copper. Avoid alkaline, neutral, and highly acid butter. Protect it from air and light and keep it cold. Normally, these safeguards are sufficient to provide the consumer with satisfactory butter.

Meat Branch Modernized to

Process Sausage

Wilson & Co. builds a new addition at Mineola, Long Island. Installs new equipment, adopts new methods.

A LOGICAL step in large-scale meat distribution—in the direction of more processing in branch plants—has been taken by Wilson & Co. To avoid shipping sausage products some 900 miles from Chicago to its branch at Mineola, N. Y., the company has installed modern facilities for processing these meats in a new addition to the branch.

The Mineola division, which serves a large area of Long Island, found that some of the sausages, such as frankfurters and bologna, did not fare so well in the long trip from the middle west. The refrigerator cars were too cold and caused the products to lose some of their appetizing appearance through "sweating."

Built onto the old plant in which processing operations had been limited to curing and smoking hams and bacon and boiling hams, the new addition comprises a sausage processing room, a cooking room, two smokehouses and three cooling rooms. The entire plant is well-lighted and well-ventilated, being on the second floor and unobstructed by surrounding buildings. The walls are painted in white with green and black on the doors where greasy hands must touch. The floors are of smooth red tile with plenty of center drains and with sloping surfaces. The equipment in the various departments is laid out in an orderly fashion around the walls, leaving the centers of the rooms clear for passage of raw materials and finished products. Overhead rails are not used, but the tanks for handling the materials are on wheels, as are the smoking trees.

In addition to modern standard equipment, the departments in this plant contain interesting and most practical innovations. The sausage room, where quality production demands proper temperature, is cooled in summer and heated in winter by two heater-cooler units of the fan type mounted at the ceiling in opposite corners of the room. The air compressor and tank which supply air to the stuffers are mounted on wall brackets near the ceiling so that they take up no floor space. The tables on which the casings are washed and on which the stuffing is done are both of stainless steel on galvanized-iron supports. A practical accessory to the casing table is a 1-ft. length of $\frac{3}{8}$-in. pipe over which the casings are pulled for flushing. This pipe is connected to a valve in the common outlet between the hot- and cold-water supply lines in such a way that when the end of it is raised about 3 in. off the table the water automatically turns on. This makes it unnecessary to trouble with control valves.

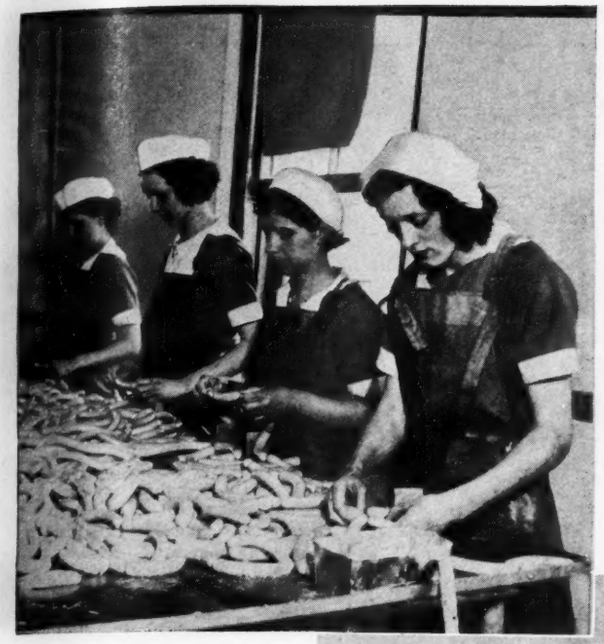
The stainless-steel stuffing table, which is about 8 ft. by 4 ft., has 1-in. raised edges and slopes to the center for draining. A 2-ft. "neck" on one end extends under the stuffing horns. Surrounding this table is a wooden platform which keeps the operators' feet high and dry off the wet floor and also gives them a resilient footing which is less tiresome. The operators doing the sausage linking use galvanized-iron gages which are adjustable to different lengths.

The other new equipment in the sausage department consists of a grinder, mixer, silent cutter, ice breaking machine and compressed-air stuffers. All of these units are of large capacity, and a feature of the motor-driven machines is push-button control placed in a forward position for easy access.

To avoid waste of time when it comes to changing knives and other parts of the grinder, the plant manager has had built a special rack on which these are hung when not in use. Mounted on the wall alongside the grinder, this rack is a galvanized-iron "board" about 3 ft. wide and 4 ft. high with a shelf at the bottom, a rack at the top and galvanized iron pegs in between.

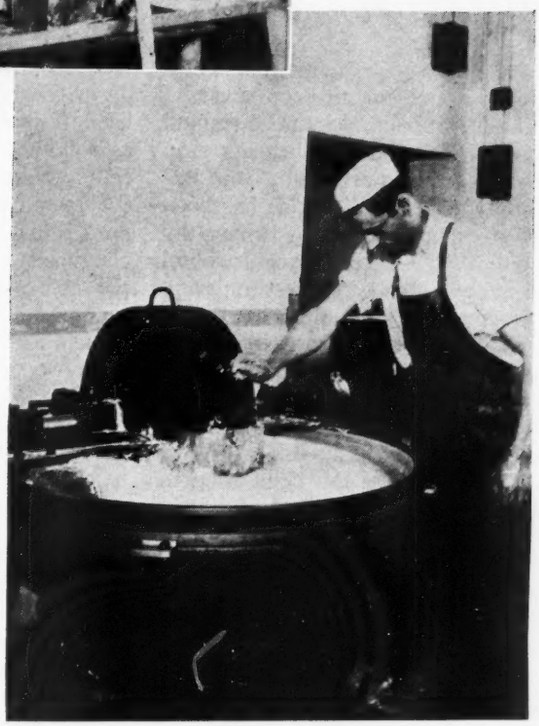
ADJOINING the sausage department, and connected to it with swinging doors that open when a truck is pushed against them, is the cooking room. On one side of this room is a reel oven for baking hams. Standing end-to-end along the same wall are cooking vats heated by live steam. On the other side of the room is a steam-jacketed galvanized-iron cooking kettle, a galvanized-iron table with a wooden cutting board and a bake-loaf dip tank.

Two pieces of equipment in this department are of special design, being used in connection with new processes introduced by Wilson & Co. One is the bake-loaf dip tank, made of galvanized iron. It is filled with a hydrogenated shortening (Bakerite), and in the bottom is a 2-in. immersion gas heater. The inlet end of the heater is connected to a Bunsen-type burner and the outlet end extends up the side of the tank as a sort of stack,



Stuffing and linking sausage on a stainless steel table. Adjustable galvanized-iron gages are used in linking.

Packing sausage in a cooler where the temperature is kept at 44 deg. F.



Meat for frankfurters being prepared in a silent cutter. Chipped ice mixed with the meat keeps the temperature down during the operation.

the heater forming a U-shape in the bottom of the tank. At one end of the tank and level with the top is a drain board of perforated galvanized iron. Flat covers, with iron handles, are provided for both tank and drainboard. This deep fryer is used for browning boiled hams to give them a "baked" effect, a procedure giving an attractive product without the enormous shrinkage suffered when the hams are actually baked.

The other outstanding new apparatus in this department consists of a gas and air burner used to caramelize sugar on top of hams. Looking something like a welding torch, this burner is taken in the hand and the flame played over the surface of the sugared meat.

NEXT to the cooking department is a sort of foyer from which access is gained to the frankfurter cooker and cooler, the two smokehouses, the elevator, a set of platform scales and two coolers. The frankfurter cooker comprises a chamber large enough to accommodate a tree of sausage, this chamber being equipped with sprays which shower the meat with 160 deg. F. water for ten minutes to cook it. The frankfurter cooler is a similar chamber with a perforated tank in the top which sprays water uniformly over meat.

The theme of modern construction is well carried out in the three cooling rooms of this new sausage products plant. The coolers are refrigerated with direct-expansion ammonia coils mounted on the walls, drain troughs are provided under each bank of coils, this in addition to the sloping tile floors and center drain. These troughs are built into the concrete border around floor and are equipped with their own drains. The coolers all are extremely well lighted by artificial light, as are all the other departments of this new plant.

The three coolers are about 15 ft. square. The one entered from the foyer is used for precooling meat that is to be packed; it is kept at about 44 deg. F. A door inside this cooler gives access to the packing cooler, kept at the same temperature. In this second room is a table extending along one wall, a set of scales and a shelf for storing empty cartons. Operators working in this cooler package all the products that go out of the new plant in cartons.

A practical idea contributing to better looking packages is used in this department. This consists of a wooden frame into which the cartons are placed while being filled. The frame holds the sides of the box in and prevents bulging in the finished package. Without this, the 10-lb. cartons would lose much of their shape.

Located off the sausage processing room, the third cooler stores supplies for this department.

THE two smokehouses serving the new plant are of the stationary type, fired with gas and using hickory sawdust. They have one compartment for meat, but this accommodates eight trees.

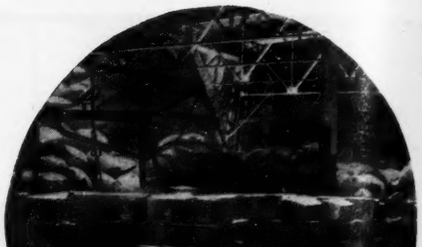
Wilson's new branch plant is said in the meat industry to be the forerunner of similar plants by other large packing houses.

On Doing Something About

TIN

Washington ponders over establishing a subsidized tin smelting industry, developing substitutes, and building a reserve supply.

By H. H. WANDERS
Market Editor,
Engineering & Mining Journal



Banka tin from the Dutch East Indies awaiting removal after being unloaded from a ship on a pier of the Bush Terminal, Brooklyn, N. Y. Each ingot weighs 80 lb. and is marked in the bar to indicate the source of origin.

WASHINGTON may do something about tin, and, according to importers of the metal rather anxious about diverting this something into so-called acceptable channels, "consumers of tin are threatened by radical legislation." Among consumers of tin, the tin can makers play an active part, but all consumers of the metal have become interested in the recent investigation of the tin situation by the Subcommittee of the House Committee on Foreign Affairs, which recommended:

1. Importation of tin ore and the establishment of a smelting industry in the United States.
2. A more thorough prospecting of possible sources of tin ore in the United States.
3. A well-organized and Government-financed research for substitutes for tin.
4. The prohibition of the exportation of tin-bearing material.
5. The acquisition and holding by the government of a reserve stock of tin for use in an emergency.

Accompanying the report, Chairman McReynolds submitted a bill authorizing the President, on recommendation of a proposed Board for Strategic Materials, to regulate the exportation of tin scrap and to assist in building up a domestic smelting industry by imposing an excise tax of 4 cents a pound on all metallic tin not produced in the United States.

WHEN the international tin control scheme was first launched, in 1931, great emphasis was placed on serving the needs of the consumer. Nothing under the plan was to be done to retard the free flow of metal to the consumer. The British Government went so far, after approving of the scheme, as to stipulate that "the consumer will be protected against excessive rise in price."

Here are a few facts that stand out in the present tin controversy: The United States lacks an adequate supply of domestic tin-bearing ore. Industrial consumers, with few exceptions, hold that the price has been raised to a point that is unhealthy economically. Current prices, around 50 cents per pound, are stimulating production of tin from sources outside of the group participating in the control plan. An uneconomic price for tin will promote substitutes.

The marked revival in consumption of tin in the United States certainly came at just the right time to make the highly organized and centralized international control plan a success from the producers' point of view. World production of tin and United States consumption, in long tons, compare as follows:

	World Production	U.S. Consumption
1930	171,000	71,500
1931	142,000	55,800
1932	92,900	40,600
1933	85,000	61,500
1934	108,000	53,800

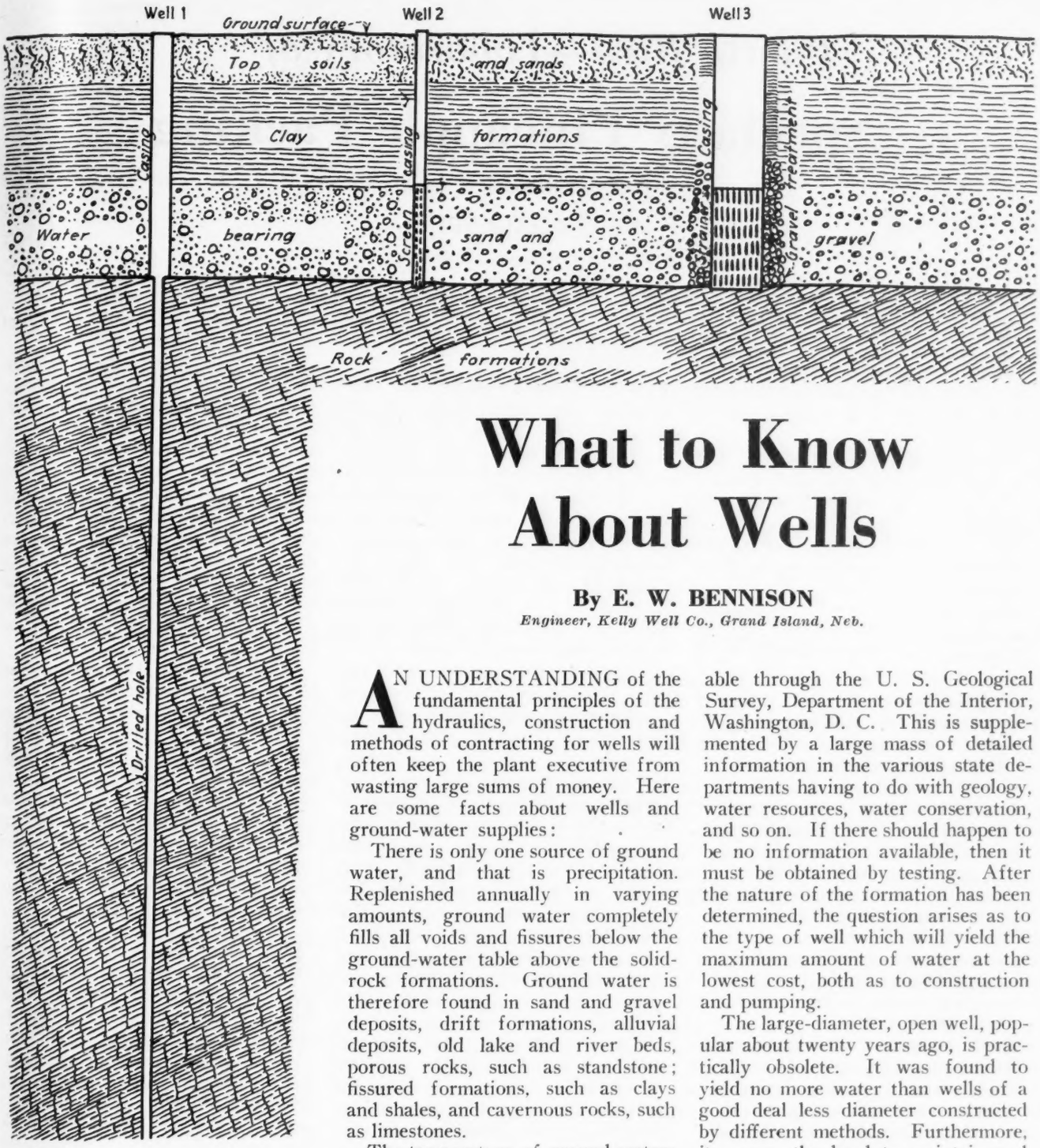
During the last fifteen years the New York price of Straits tin has averaged around 43¾ cents per pound. The low for the depression was 18.35 cents per pound in April, 1932. The yearly average for Straits tin, New York, in 1934 was slightly higher than 52 cents per pound.

Producers of tin see no immediate danger in the widespread activity for developing substitutes. However, producers of tinfoil and makers of collapsible tubes state that they have experienced keen and growing competition from aluminum products. Consumption of tin in this field in this country is not large, but nevertheless important. At the hearings in Washington it was disclosed that the percentages of total supply of tin used for various purposes are about as follows: Tin in tin-plate, 42.4 per cent; solder, 17.43 per cent; babbitt, 8.31 per cent; collapsible tubes, 5.84 per cent; bronze, 5.35 per cent; chemicals, 4.99 per cent; foil, 4.68 per cent; tinning, 4.3 per cent; and tin oxide, 1.02 per cent; miscellaneous, 5.68 per cent.

Those close to the tin industry, but not interested in the tin controversy for financial reasons, believe that many substitutes for the metal will be developed in time.

Word from Norway states that 10,000,000 aluminum cans were used in packing fish in that country during 1934, which compares with 2,000,000 aluminum cans in the year previous. The cans are attractive and merchants say the containers have been an aid in marketing the product. The aluminum container has been used for packing fish in the United States, though on a smaller scale. Mention has been made in trade circles that a process for plating sheet steel with aluminum has great possibilities. The tin producer may feel secure in a 50-cent price for tin, but the handwriting is on the wall.

EVIDENCE is accumulating that the search for substitutes is on in earnest and that something is being done that points to a contraction in the use of a very useful metal. In developing substitutes for tin, with or without aid from Washington, the tin producers will have more to worry about in the future than the construction of a smelter or two under the eye of the government.



Well No. 1: Small-diameter, deep-rock well (drilled). Water-bearing sands and gravels are cased out. Supply is derived from fissures, crevices and seams in solid-rock formation. Capacity depends on formation.

Well No. 2: Small-diameter tubular well (drilled). Screens with fine slots hold back fine sands. Capacity depends on capacity of screen.

Well No. 3: Large-diameter, gravel-treated well (dug). Strainers with large openings hold back gravel treatment. Capacity depends on capacity of formation to yield water.

What to Know About Wells

By E. W. BENNISON
Engineer, Kelly Well Co., Grand Island, Neb.

AN UNDERSTANDING of the fundamental principles of the hydraulics, construction and methods of contracting for wells will often keep the plant executive from wasting large sums of money. Here are some facts about wells and ground-water supplies:

There is only one source of ground water, and that is precipitation. Replenished annually in varying amounts, ground water completely fills all voids and fissures below the ground-water table above the solid-rock formations. Ground water is therefore found in sand and gravel deposits, drift formations, alluvial deposits, old lake and river beds, porous rocks, such as standstone; fissured formations, such as clays and shales, and cavernous rocks, such as limestones.

The temperature of ground waters is approximately 54 deg. F. in the surface formations and increases approximately 1 degree for each 100 ft. in depth. Ground waters occurring in the unconsolidated formations above the rock are generally softer than those found in the underlying rock. However, from a sanitary standpoint, the waters in the formations lying closest to the surface are more likely to be contaminated by bacteria.

Information concerning ground-water formations in practically every portion of the United States is available through the U. S. Geological Survey, Department of the Interior, Washington, D. C. This is supplemented by a large mass of detailed information in the various state departments having to do with geology, water resources, water conservation, and so on. If there should happen to be no information available, then it must be obtained by testing. After the nature of the formation has been determined, the question arises as to the type of well which will yield the maximum amount of water at the lowest cost, both as to construction and pumping.

The large-diameter, open well, popular about twenty years ago, is practically obsolete. It was found to yield no more water than wells of a good deal less diameter constructed by different methods. Furthermore, it was costly, hard to maintain and unsanitary.

Small-diameter tubular wells followed open wells in popularity. These were constructed by sinking an ordinary steel pipe of from 6 to 12 in. in diameter to water-bearing strata and then placing on the lower end a screen suited to the sand formation. It was soon found that wells of this type, because of the fineness of the screens and the corrosive action of ground waters, were subject to clogging and corrosion and

(Turn to page 416)

Puerto Rico—Laboratory of
Specialty Pineapple Packing

A Reply to Matthew E. Highlands

By E. R. JAGENBURG*

Vice-President, Richardson Sales Corp., New York, N. Y.

THE production of canned pineapple in Puerto Rico is important to American manufacturers not so much as a quantity source to which they may turn, but as a readily controllable output of a conveniently accessible tropical laboratory in which to experiment with high-grade packs.

It is in view of this strategic importance of Puerto Rico as a pilot plant or industrial laboratory for producing the finer grades of merchandise that the public is demanding today, and will continue to demand tomorrow, that the writer is impelled to answer the implied criticism of backwardness, lack of proper manufacturing conditions, etc., contained in the article by Matthew E. Highlands, which appeared in the June issue of FOOD INDUSTRIES.

Mr. Highlands gives a fine and very exact picture of the industry as it was several years ago. Not only, as he states in his article, did it "leave much to be desired"; actually it was careless, slovenly, and ignorant of the needs of the purchaser.

During the last several years this picture has changed to a very wholesome and surprising degree. Of the five plants located within a radius of 25 or 30 miles of San Juan, one of them—a plant of some size—is kept so immaculately clean that one may literally eat off the floor. Another, a smaller plant, whose star is rapidly rising in the production picture, is clean and well taken care of.

These two plants are as sanitary and as efficiently operated as any fruit canning factories on the North American continent. The other plants, about which the writer personally knows less, have been notably infected by the spirit of progress, and are understood to be making substantial strides in the direction of securing favorable acceptance of their product through the employment of American standards of sanitation and management.

IT IS fourteen years since the writer first began using Puerto Rico as his experimental laboratory in the production of specialty pineapple pack for the American soda fountain and ice cream trade, and he has spent from four to six weeks of each year on the ground in Puerto Rico, participating in a practical way in the development of modern production processes for the pineapple industry and in educating local packers to the needs of the American public.

To make tropical producers see the need for the exacting requirements of American manufacturers was at first not an easy task, and at times the response was slow and disappointing. However, the ready acceptance of the improved product by the ice cream and soda fountain supply manufacturers has opened the eyes of these men to the really great future in specialty packs that lies ahead for the insular industry. The baking industry, too, has been quick to appreciate the advantages of specially prepared, fine-flavored pineapple packs for pie fillings and various baking specialties.

The necessity for hand-trimming and hand-coring to remove the deep eyes of the Puerto Rican fruit has led to another quality advantage of the finished product, because less of the surface layer of fruit is removed in the process, and as perhaps everyone knows, it is this surface layer that is richest in pineapple flavor.

One factory has gone a step further in the quality improvement of its pack and overcome the objectionable "stringiness" which results when the fruit is crushed by the usual tearing process; by a new cutting technique. A decided advantage of this method is an improved flavor quality. Obviously, a juice that is retained in its natural state in the fruit cells is better preserved than a juice that has been crushed out of the fruit and exposed to the elements.

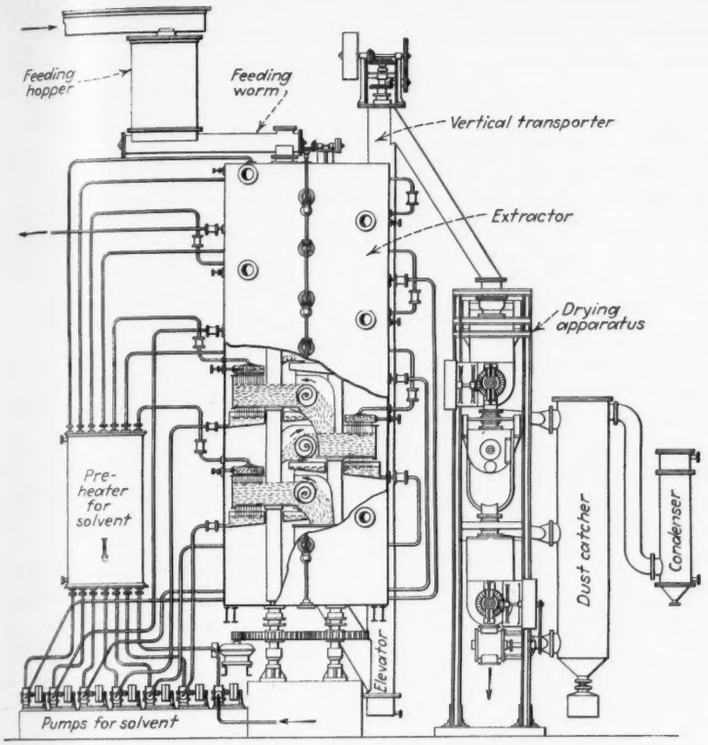
There is no finer or more delicious pineapple than the Red Spanish variety, if properly and carefully cultivated. Then, too, the taste of the new canned product comes closest to duplicating the flavor of the fresh pineapple with which the American consumer is familiar. This is of very real significance to the ice cream and soda fountain supply manufacturer for, whereas 95 per cent of the Hawaiian crop is canned, the bulk of the Puerto Rican crop reaches our market in the fresh form.

It is this fresh fruit, rather than the canned, that influences our judgment as to what good pineapple ought to taste like. If we think about it a moment, we realize that the American consumer has been educated to an appreciation of the Puerto Rican varieties which supply our fresh fruit markets, and predominantly Red Spanish, rather than Smooth Cayenne which comprises the bulk of our canned imports.

THERE is thus a real reason for American buyers to forget their prejudice against the Puerto Rican canned pineapple that "was," and to investigate the Puerto Rican fruit that "is"—at least in so far as the manufacture of quality goods is concerned. Puerto Rico will never again be a price market for specialty pineapple for, during the last several years she has accepted the challenge for quality leadership in canned pineapple production, and she is finding more profit in functioning as our laboratory for the production of premium packs than she ever did, or could hope to, in the mass market in which Hawaii always will be supreme.

After communicating the contents of this discussion to the author of the article (see June, 1935, FOOD INDUSTRIES) to which Mr. Jagenburg takes exception, Mr. Highlands indicates he has no retractions to make.— EDITOR.

*Mr. Jagenburg was formerly president and general production manager of Crown Fruit & Extract Co., Inc.



In the Boehm System is found one of the most modern plants for the continuous extraction of oil from soy beans. It has an output capacity of from 30 to several hundred tons of beans daily.

Newer Methods of Refining Soya Oil

Preserve Its Food Value

By A. A. HORVATH
Newark, Del.

DISSATISFACTION with existing methods for refining soya oil has resulted in discovery of a method which is of great commercial importance because of its simplicity and of the quality of the oil obtained.

A measure of its commercial importance is found in the fact that approximately one-sixth of the total 1930 production of 37,200,000 lb. of soya oil was utilized for edible purposes. The United States acreage for that year was 3,758,000. By 1934 the soy bean crop for the United States had increased to 4,107,000 acres with a further increase of 890,000 acres for 1935. The 20 per cent oil content of the soy bean is the basis for this increasing interest in the soy bean.

In 1925 Hornemann[1] showed that if the oil was obtained by pressure all of the fat-soluble vitamins remain in the cake. But if an extraction method be used the oil contains all the vitamins A and D.

Unfortunately these vitamins are destroyed and removed during the usual refining operations of clarification, free-fatty acid elimination, bleaching and deodorization.

Clarification consists of leaving the oil in a tank sufficiently long to allow the impurities to settle, after which the clear oil is run through a good filter press or a centrifuge. Both neutralization of free fatty acid content and removal of some coloring matter result by refining the oil with sodium hydroxide. However, a certain excess of alkali over that required for neutralization of the acids must be present.[4a]. Also the alkali solution should not be stronger than 20 deg. Bé. Yet, it can either be mixed with the oil at room temperature and the temperature slowly raised or be mixed at an initial temperature of 30 deg. C. Settling of the soap formed is accelerated at 55-70 deg. C., but at 80 to 95 deg. C. the decolorizing is more effective; the losses are greater also. Application of pressure, 15 lb. per sq.in., for 30 minutes helps to speed up the separation of the oily layer. Removal of traces of alkali and soap is obtained by washing the clear oil with 20 to 30 per cent of water at 50 to 60 deg. C. If the water does not separate quickly a solution of common salt may be added. Last traces of soapstock are sometimes removed by use of dilute sucrose solution. In the Bollman[2] and Tcherdynzev process ethyl alcohol is used for refining purposes. The free fatty acids are readily soluble in the alcohol, whereas the soya oil is only slightly soluble in this solvent at room temperature.[3]

Table I—Chemical Composition of Soya Oil

Glycerides	Per Cent
Palmitic Acid	2.4 to 7.3
Stearic Acid	4.4 to 7.3
Arachidic acid	0.4 to 1.0
Oleic acid	32.0 to 35.6
Linolic Acid	51.5 to 57.0
Linoleic Acid	2.0 to 3.0

Drying of the soya oil under a vacuum at 90 deg. C. precedes the removal of coloring by bleaching with clay. Bleaching of soya oil is quite difficult; about 5 per cent of highly active bleaching clay (Fuller's earth) is required, although neutralized soya oil from good quality seed requires only about 2 per cent. Bleaching accomplished in 20 minutes at 90-105 deg. C. is followed immediately by rapid passage through a large filter press to avoid reabsorption of color by the oil.

Deodorizing is carried out in a 10 to 15 mm. vacuum at 150 to 170 deg. C. (optimum 150 to 155 deg. C.) by blowing 200 to 300 deg. C. steam through the oil. While the time usually is from three to four hours it sometimes has to be doubled; depending upon the efficiency of the vacuum. Rapid cooling of the deodorized oil is said to affect its taste and filtering qualities.

Minimum refining losses of soya oil by this method amount to about

10 per cent* as well as refining expenses.

THE NEW PROCESS begins with the refining of the oil in the unmilled bean and ends with the actual separation of the oil by the solvent method. In 1927 the odor of crude soya oil was identified as mainly due to presence of methyl-*n*-nonyl ketone. This ketone is removed (distilled out) by heating the whole beans in absence of oxygen. During this process the oil-damaging lipases and peroxidases of the beans are inactivated.

After such treatment the refined oil is extracted from the beans by one of the recommended solvent methods. The quality of the obtained oil is largely dependent upon the kind of solvent used and the extraction procedure employed. Sedimentation or centrifuging of the oil is required. According to Mattill,[5] "oil extracted by an organic solvent is much less susceptible to oxidation, although its content of sterols and their acetyl value are the same as found in crude expeller oil."

One reason for such a difference is that the solvent method extracts from soybean not only oil, but also lecithin, which is an anti-oxidant; the press methods leave the lecithin in the meal. Other causes, such as bringing the oil in contact with enzymes, catalysts and oxygen during the milling operation in the press method, can also be mentioned. The new solvent process soya oil also contains the vitamins A, D and E and differs in appearance, in behavior upon heating, and in taste from the usual refined, standard samples.

One can visualize that this new refining process is going to have far-reaching effects in the future of soya oil in the edible field; particularly since it marks the first production of a refined vegetable oil containing substantial quantities of vitamins A, D and E and possessing good keeping qualities. Quoting Mattill[5 6] further, "the oxidative changes that accompany the beginning and development of rancidity in unsaturated animal fats tend to destroy vitamins A and E," and "the oxidative destruction of fat-soluble vitamins A and D in experimental diets containing animal fats such as lard and codliver oil is more rapid than when these fats are replaced by vegetable oils of equal or greater unsaturation."

IN RECENT years much emphasis has been placed on irradiated foods as a source of vitamin D, but it was not adequately pointed out that irradiation induces rancidity which destroys vitamin A. For example, Read and Bailey[7] found that in crackers made with lard "even a few seconds of exposure to ultra-violet light served to accelerate the development of rancidity," and Holm[8] found that "in fats and oils irradiation catalyzes autoxidation," and that "oxidation is a serious factor in vitamin destruction." Refined soya oil, produced by the modern method, is a valuable source of vitamins A and D; a source in which vitamin D is not formed artificially at the expense of the vitamin A content.

Refined soya oil is used mostly as a substitute for salad oil, often being blended with other oils. In this country it has recently found a new channel, namely, in the mayonnaise industry.

The domestic consumption of soya oil in the production of margarine amounted in 1918 to nearly 6,000,000 pounds; in recent times it is again gaining in popularity as the interest for margarine in this country is rapidly developing. The following proportions are recommended for obtaining products of various melting points:[3]

Melting point 25 deg. C	
Premier jus (oleo stock)	15 per cent
Palm kernel oil	50 per cent
Coconut oil	15 per cent
Soya oil	20 per cent
Melting point 24.5 deg. C	
Oleo-stearine	15 per cent
Coconut oil	45 per cent
Palm kernel oil	20 per cent
Soya oil	20 per cent
Melting point 21.5 deg. C	
Coconut oil	70 per cent
Palm kernel oil	10 per cent
Soya oil	20 per cent

The constituents are susceptible to a certain variation between the warmer and colder months of the year. For summer time a double amount of *premier jus* can be used, to make the margarine more solid, while for winter time one can use a double amount of soya oil.

In Europe soya oil is one of the preferred raw materials for the manufacture of margarine,† and samples of such margarine, demonstrated at the 1928 exhibition in Berlin, were taken by the experts for butter. They contained the following proportions:

	1	2	
Coconut oil, per cent	70	80	
Palm oil, per cent			63
Sesame oil, per cent	12	12	12
Soya oil, per cent	18	8	25

Since it contains vitamins A and D, as well as lecithin, soya oil, refined by the new process, would be of special value for the manufacture of such margarine. The lecithin acts not only as an emulsifying agent, but also as an anti-oxidant, and, in addition, promotes the "browning" and prevents "spitting" of the margarine, thus adding to its value as a butter substitute.

UNDER certain conditions soya oil seems to possess emulsifying properties, as is illustrated by the specific test for soya oil developed by Prof. Morosov[3] for its detection in mixtures with other oils:

5 c.c. of an oil is mixed with 2 c.c. of chloroform and then 3 c.c. of a 5 per cent aqueous solution of copper sulphate or cobalt nitrate is added. When the mixture is shaken well for one minute, an emulsion is produced; the stability of which depends on the kind of the oil. Refined soya oil, sunflower oil, crude hempseed oil, peanut oil and cedar oil have been investigated in this way. Soya oil gives a very stable emulsion, while with other oils the emulsion very soon is divided into two immiscible layers. When some specimens of crude bean oil are used a flocculent precipitate is formed. By this method 10 per cent of soya oil added to hempseed oil is easily detected.

Certain preparations of soya oil are highly effective in stabilizing emulsions of water or milk dispersed in oil (margarine) as, for instance, Schou's product which is prepared by oxidizing soya oil at 250 deg. C. until gelatinization occurs. After cooling to 100 deg. C. the gelatinized oil is mixed with twice its volume of cold soya oil, yielding a pale brown oil of syrupy consistency. As little as 0.5 per cent of the emulsifier is necessary to be dissolved in the melted fatty phase in margarine manufacture to permit the stable dispersion therein of milk or water.

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*Quoting Holm "neutralization with strong alkalies always involves some hydrolysis, and this is detrimental to the keeping quality."

*Domestic market quotation (Chicago) during the first week in April, 1935, was 10.7c. per lb. for unrefined soya oil and 11.7c. per lb. for refined oil.

†In 1933 German soya oil mills extracted (by the solvent method) over 40,000,000 bu. of imported soy beans, while the quantity of the beans processed for oil in the United States (predominantly by the press method) amounted to only 4,500,000 bushels.

FOOD PACKAGES and PRODUCTS

A, B, C Packaging. The element of child psychology has been introduced in packages developed by Kinder Mills, Lockport, Ill., for its new cereal, "Kinder-Gruel." The packages are A, B, C "blocks," in three separate colors, which the child may use after the cereal is removed. Cubical in shape, the packages are cardboard cartons tight-wrapped with paper on which the A, B, C's and other label elements are printed. These packages also have the display value of the bright red, yellow and blue colors.

Kinder-Gruel is just as interesting as the package. It consists of a 50-50 blend of wheat and oats. The process, according to the company, is one of reducing the grain to small particles, aspirating away the undesirable portions, mixing with an iron compound and flaking. The cereal cooks in two minutes.

The purpose of combining wheat and oats is to produce a more palatable product than either cereal alone and to give a more equitable ratio between protein and carbohydrate contents. The iron compound is added to meet the "deficiency" in the cereal.

Wallet Package. R. C. McAteer Co., Pittsburgh, has done away with the bag-with-an-envelope package for its soft-drink powder, "Thirst-Ade." The company has devised a sealed kraft envelope with a bristol board outer cover which folds like a wallet and has a die-cut locking device on the back. This is said to give greater rigidity and smoothness to the finished package, make it look better and make it "feel like more for the money." The company also has devised an effective display. The packages are arranged in three parallel rows in a carton on the front of which is pictured three of the containers. This gives the effect of a full view of the first package in each row.

Guaranteed. "Why hog-tie distribution by carefully refraining from giving Mrs. Consumer a guarantee of satisfaction?" Having raised this question, G. P. Halferty Co., Seattle, decided to label its new "Show Boat," vacuum-packed, fancy salmon with "satisfaction guaranteed." The company realized when it added this new product to its line that there was plenty of canned salmon already on the market. But it felt there was room for another brand of exceptional qualities.

To successfully pack this high quality product naturally requires extra

FOOD PACKAGES and

care in processing. As for instance, the company adopted a rigid rule that all salmon must be in the cans within seven hours after leaving the water.

When Halferty adopted the satisfaction-guaranteed label, critics warned against a deluge of requests from people taking advantage of the guarantee, but the company has sold 100,000 cases and have only been asked to make the guarantee good in one instance.

Blue Ribbon in Tins. Premier-Pabst introduced last month in Cedar Rapids, Iowa, and Rockford, Ill., beer in the new "keglined" tin can which was first utilized by G. Krueger Brewing Co., Newark, N. J. But Pabst calls the container the "Tap-a-Can," presumably because the beer is supposed to taste like that on tap. And the company labels the product "Export Beer," suggesting that it will be put into foreign markets where bottled beer was unprofitable because of the freight charges (the canned beer weighs 55 per cent less).

Prune Bread. To capitalize on the apparent demand among consumers for "health" bread, Williams Baking Co., Scranton, Pa., is marketing "Prune-O-Wheat." This gives the company another specialty of the type which the baking industry feels is needed to gain back part of its lost consumption. Made of flaked wheat and containing concentrated prune juice, the bread is promoted for its laxative properties. It is packaged in sealed transparent cellulose which displays its attractive color, the label information being printed on a paper band around the loaf.

Glass of Juice. To entice the public to a wider use of "Silver Nip" grapefruit juice, Florida Fruit Canners, Inc., Frostproof, Fla., has adopted a package that not only is unusually attractive, but has reuse value. It is a glass tumbler with a trim metal cap, a neat label and an all-over wrap of colored, transparent cellulose. This design treatment makes an effective package. Consumers are expected to reorder the juice to collect a set of the tumblers.

Marshmallows in "Metal." Found effective for packaging potato chips, a "metal" bag has been adopted for marshmallows. Used by Imperial Candy Co., Seattle, for its Societe brand, the bag is printed in blue and white on silver. And to avoid losing the advantage of displaying the product itself, marshmallows are pictured on the front of the bag. Adopted to prevent moisture loss, the bag is labeled "freshness guaranteed." Results of tests reported by Reynolds Metals Co. indicate that the bag permits less than 1 per cent moisture loss under conditions of 0 to 5 per cent relative humidity and 80 deg. F. for 25 days.

Changes Carton. General Baking Co., New York, has adopted a different type of container for its vitamin D "Bread Krums." The product formerly was packaged in a round, spiral-formed can having special moisture resisting compound between the plies of the body and caps. This package was labeled after filling. The type now used is a round laminated can, the inside of the body being treated with moisture resisting com-

PRODUCTS

pound and the caps having the compound between plies. Labels are applied to this container prior to filling. Cylindrical in shape and attractive in label design, this can has a large metal pouring spout for the consumer's convenience. It also carries a list of recipes on one side.

Interesting Family. An unusual family of packages is the one for the Sally-May line of salad dressing and mayonnaise products put out by Spaulding Bakeries, Binghamton, N. Y. Packed in glass tumblers with caps held on by vacuum, the different products of this line stand out distinctly and yet have a strong similarity. This effect is accomplished by using the same cap and label design and by varying the design of the tumbler itself. Not only do these packages stand out, but the design is "refreshing."

Changes Design. To make it more attractive and distinctive, Corn Products Refining Co., New York, has changed the design of its Kre-mel package. It has adopted a cardboard carton with a full glued, tight-wrapped outer paper wrapper which "hermetically" seals the package. A three-color printing job on the wrapper, with a different color design for each of the five flavors, gives the container sales appeal and a "family" resemblance. Customers have reacted favorably to the change, according to an executive of the company.

Potato Chips in Foil. Another potato chip manufacturer has put its product in "metal." A family of foil packages have been adopted by G. & G. Potato Chip Co., Cohoes, N. Y. The one-ounce size comprises a "metal" bag printed in blue on silver. Quarter and half-pound sizes are cartons sealed in "metal" wraps and printed in dark blue and orange on silver. These new packages are credited with being lightproof, moistureproof, and greaseproof—reducing the necessity for frequent deliveries and excessive pick-up of stale packages. Alexander P. Grega of the G. & G. company says the response of dealers and consumers has amply justified the change to the new packaging material.

Rancidity Inhibitor. Avenex is to be the trade name of the finely milled oat flour which can be added to fatty foods to inhibit rancidity. The under-

lying theory was discussed by Sidney Musher in April and July, FOOD INDUSTRIES.

Fetching Package. Apple butter, being dark in color, lends itself to attractive packaging in glass. And full advantage of this attribute has been taken by Squire Dingee & Co., Chicago, in designing the container for its "Ma Brown" brand. The

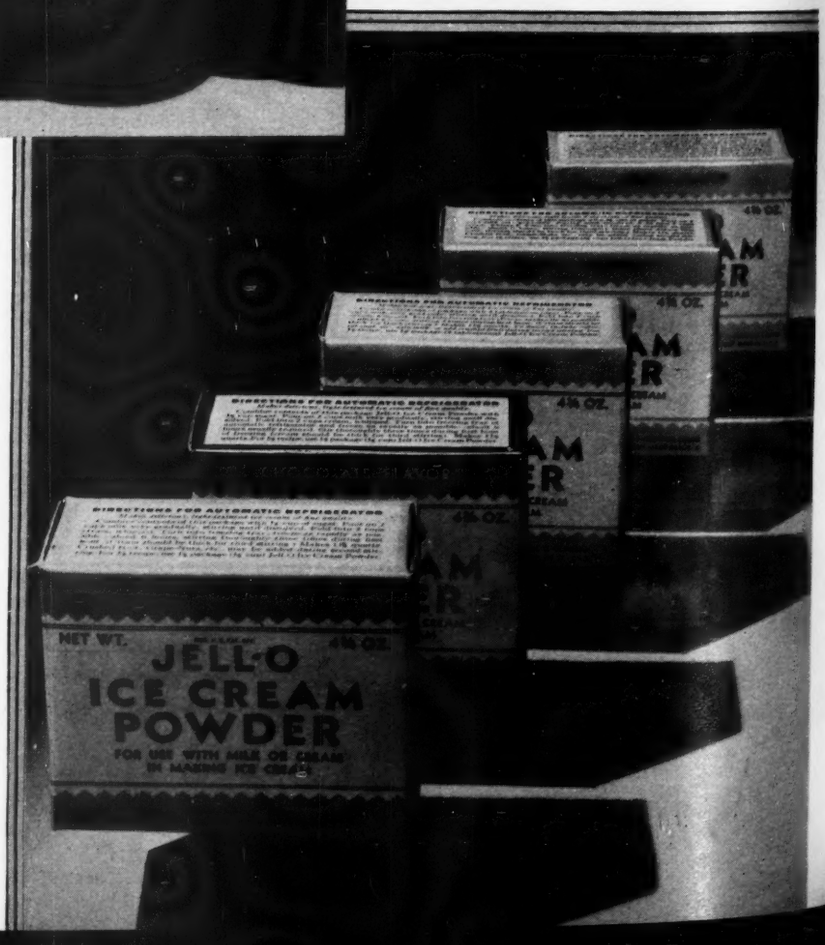
jar, a wide-mouthed one, has pleasing contours and is smooth except for decorative triangular ridges on either side of the label. Contrasting with the dark color of the product is a light colored, pry-off cap which may be used for resealing, and a light-colored, artistically simple label. The product is packed under vacuum.

Revamps Package, Product. Modernization of both the product and the package has been effected by General Foods Corp., New York, in the case of its Jell-O ice cream powder. Now being introduced nationally at the new low price of "three for a quarter," the product has been so improved in the research laboratories, according to General Foods, that it is in effect a brand new item. The revamped package has a family design for four flavors and one unflavored variety. The color and layout have been brightened, and each flavor distinguished by a different colored band around the border of the box. Each package contains enough for about three pints of ice cream.

The company has launched the product with a national advertising campaign and is using a recipe booklet, counter displays and window posters for additional promotion. The booklet is a compilation of recipes developed in General Foods' kitchens and contributed by some of the 500 housewives to whom the product was submitted before being put on the market.

Lighter Pressure Ware? In a move to stem the acceptance of tin cans for beer, a leading glass manufacturer has designed and will produce soon a "one-trip" beer bottle, it is reported on good authority. Made to process successfully on existing equipment, the new bottle will be shorter than the traditional type, considerably lighter in weight and will require cartons of less cubical content. This is expected to reduce initial cost, freight charges and cost of handling and storage.

More Beer Cans. Two new tin cans for beer will make their appearance within the next month or so. Developed by Continental Can Co., Inc., New York, during the past two years and used in experimental packs in various breweries, one of the new cans will be similar to the standard can used for fruits and vegetables. The other will have a cone-shaped top with a crown cap of the type now used on beer bottles.



and PRODUCTS

Milk-Shake. Baker Extract Co., Springfield, Mass., has brought out a new product called "Milk-Shake." It is made with sweetened cocoa, dry milk from which the fat has been almost completely removed, malt powder, salt and flavoring. It is put up in cardboard cartons containing 5 oz. to retail at 10 cents, one carton being sufficient for ten drinks. The consumer mixes the preparation with milk.

Visible Doughnuts. Five doughnuts, stacked one on top of the other, are being marketed in a nitrocellulose-lacquer-coated glassine bag by Colonial Baking Co. Inasmuch as it is transparent, the bag permits the product to exert its appetite appeal and at the same time keeps it sanitary. The container folds over at the top and is held closed with a clip. The trademark and name of the manufacturer are printed on the bag.

Ward Baking Co., New York, also is using this packaging material for doughnuts, but wraps them in sheets instead of using a bag. Placed around five or six of the doughnuts, the material is held in place with a printed paper band.

Pouring Mustard. "Shake well" and "Pour it," printed on the cap of the mustard jar of Olds Products Co., Chicago, indicate the idea back of this new condiment. Packaged in a stippled glass container with a wide base and small neck, this mustard is of a consistency permitting it to be poured like ketchup and doing away with the use of paddle or spoon. The attractive design of the container enables it to be placed directly on the table.

Attractive Confection. A product which it is advantageous to display but which must be protected against moisture loss, marshmallows have been packaged in transparent cellulose bags by Shotwell Manufacturing Co., Chicago. The "Hostess" brand is put up in one-pound bags with label elements printed on the front. Shotwell also has adopted a shipping carton for the marshmallows the design on the outside of which ties in with the design of the package.

Appleflakes. Dehydrated apple in cardboard cartons has been introduced by T. S. Simms & Co., Ltd., St. John, N. B. Labeled "Appleflakes," this food comes after seven years of research to achieve a product retaining the color, structure and flavor of the fresh fruit when dehydrated. Not only were new processes introduced, but new machinery has been, and still is, being evolved. After completing the first season's run, the company decided to revise its plant and equipment in accordance with findings growing out of the production experience.

The dehydrated sliced apples are put up in a carton of asphalt-laminated board which the company feels is as important for protection against certain rays that penetrate ordinary cardboard and most outer wrappings as it is against evaporation.

Canned Dinner. In response to a demand for a "complete meal" in tin, John Morrell & Co., Ottumwa, Iowa, has added to its line "Beef-'N'-Vegetable Dinner." Ready to be served as soon as it is warmed, the dinner contains beef, potatoes, carrots, tomatoes, a touch of onion for flavor and brown gravy. The product is sold in two sizes, the one-pound serving two or three, and the family size, four or six.

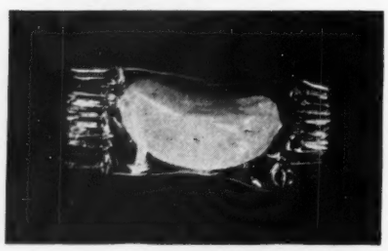
Moisture-Resisting Packet

Gives Hard Candy a New Market

By WALTER ZWOYER
Manager Mechanical Division,
Henry Heide, Inc., New York, N. Y.

A SUMMER market for hard candies, a saving of 2 to 5 cents per pound in packing costs, and a need for $10,000 additional production equipment to meet demands of hard candy sales are among the benefits accruing from the new type package, in fact a package, for individual hard candies and 1-cent candy items developed in the plant of Henry Heide, Inc., the 66 year-old candy manufacturing concern of New York City.

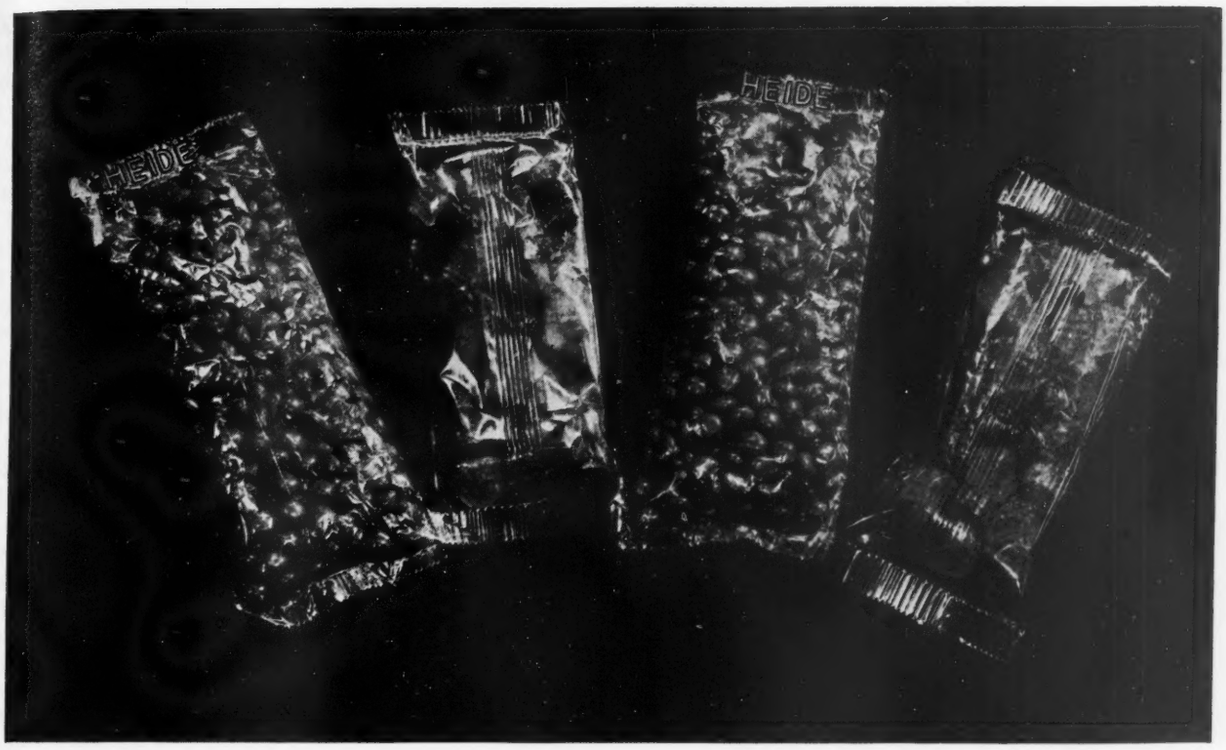
This package is fashioned from 2½ to 5 3/16-in. width rolls of the moisture-resisting, heat-sealing grade of transparent wrapping cellulose by an indivdual machine which also fills, seals, and embosses the package to indicate the net weight and the identity of the manufacturer of its contents. Thus far the machine has operated successfully only on the M.S.T. grade of Cellophane and only through a vertical plane. Proposed changes in the design of the machine will permit its operation through the horizontal plane and possibly the use of other makes of heat-sealing transparent packaging materials. The Henry Heide, Inc., packages have been made from unprinted Cellophane but under the control of a photo-cell or "electric eye" attachment the printed roll can be used.



Small and irregular pieces are individually packaged.

In the Heide plant individual pieces of such bulk hard candy as fruit slices, filled hard candies, and cinnamon sticks are packaged in packets ranging from 2 3/16 to 2⅓ in. long and having the cross-section diameter of the unit packaged; ½ to ¾ in. These packets are heat-sealed across top and bottom with serrated edges to make for easy opening by tearing. They are particularly adapted for the wrapping or packaging of irregular shaped items as well as the regular or angular shaped pieces. Heretofore fruit-slice candies have defied all attempts to give them a

Packets of ½-oz. or greater capacity may be embossed to identify manufacturer and to give net weight of contents.

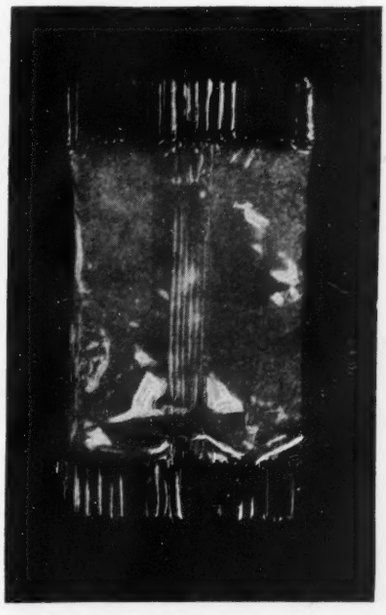


machine-applied transparent wrapping or covering.

The packets are formed, filled, and sealed at the rate of 178 packages per min. at an approximate cost of 2 cents per lb. including packaging material, labor, and power and they make possible the packing of hard candies for bulk shipment in corrugated cartons as well as in smaller retail consumer containers.

UNTIL these packets were introduced to the market in an experimental way two years ago hard candies were marketed during the summer months principally by packing in glass jars. The advanced price which packing in glass entails and the tendency of the candies to stick together and "grain" after the airtight seal on the jar had been broken prevented the establishing of a substantial market for hard candies during the humid summer months except in the form of lolly pops or suckers on sticks and in the form of tablet-like fruit drops or lozenges tight-wrapped in moisture-resisting waxed paper and foil. Enclosed in these transparent packets these candies are not only protected against open exposure to moisture-laden air with subsequent sticking together but also against coming in contact with moist hands during handling. The torn-open packet even serves to protect the fingers of the consumer from becoming sticky while

Packets containing powders, flavored sugars, or a plural number of items are heat-sealed along long dimension as well as across top and bottom ends. Serrated edges make opening easier.



transferring the pieces of candy to the mouth.

More recently this packet has been introduced into England for the packaging of individual nutmegs to prevent their deterioration through loss of highly volatile constituents and through moldiness due to absorption of moisture.

Another form of this packet is the ½ to 2½-oz. packages varying in diameter from ¾ to 2½ in. and in length from 1 to 6 in. These packets are formed, filled and sealed at the rate of 65 to 100 per minute depending upon the length of the packet.

They have been used primarily by Henry Heide, Inc., for "penny" items formerly packaged by hand on a piece-rate basis. These items include caramel beans, chocolate coated peanuts and raisins, cinnamon imperials, dairy creams, fruit balls, jelly beans, ju ju berries, lemon drops, salted peanuts, and sugar coated burnt peanuts; all ½ oz. net weight. The same items can be packed in 2½ oz. packets by merely adjusting the machine for length of packet. This adjustment is a manual one and can be made in less than five minutes.

A feature of this form of the packet is the heat-sealed closure along the long dimension as well as across the ends. The seals are so strong that the packets and their contents can be dashed against the floor or wall with crushing force until the contents are reduced to powder before the seals are forced open. Also these packets may be embossed across one end to identify the manufacturer and across the other end to designate the net weight of the contents of the packet. The edges of the ends may be serrated to facilitate opening. Dies for embossing the ends are made so that the bottom half embosses the top end of one packet and the upper half embosses the bot-

tom end of the succeeding packet. The cut-off knife is adjusted to separate the packets between the two imprints. Such dies can be put in or replaced in about fifteen minutes.

PACKAGING of these items in this manner results in a saving of 8 to 10 cents per 100 packages. The production by hand was seven packets per minute using a preformed tube.

Other food products now being experimented with in these packets are flavored sugars, cocoa and dessert powders and individual lunch portions of salt.

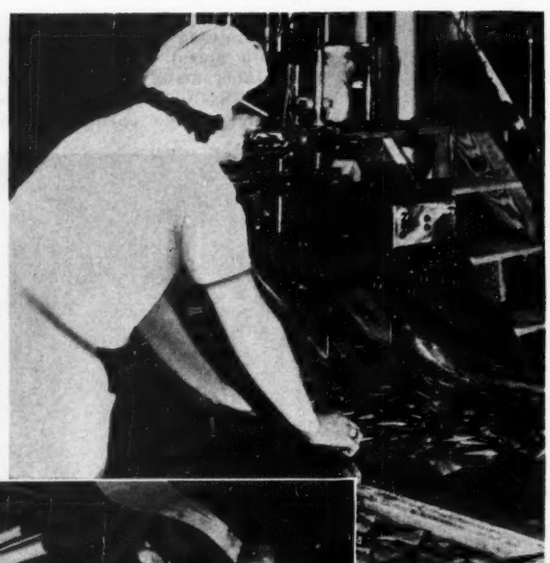
The machine by which these packets are made, filled, and sealed consists essentially of an overhead reservoir or feed hopper, fitted with a screen to hold back over-sized pieces or agglomerates, which supplies units to be packaged to a revolving feed head containing tube-like pockets. Capacity of these pockets vary according to the product being packaged and is controlled through the length of the pockets which can be made longer or shorter to deliver the desired net weight by volume measurement. Pockets in this feed head are made from standard diameter tubing which can be cut to suit. They are replaceable in twenty minutes to give adjustability to the machine on a variety of items.

From these measuring pockets the products to be packaged are delivered at a uniform rate to the forming tube around which the transparent material is shaped after delivery from the 2½ to 5 3/16 in. width rolls on the back of the machine. The width of the roll must be sufficient to give a tube of the desired diameter cross-section plus a ⅜-in. lap to insure a good seal running lengthwise of the packet. These forming tubes may have a circular, square, rectangular or oval cross-section to suit the need of the product being packaged.

The transparent material feeds around this forming tube and inside a collar or guide which prevents pleating or wrinkling as the material is formed into the packet shape with the longitudinal opening being closed by lapping or heat sealed by pressure of an electrically heated corrugated roll, against one side of the forming tube and directly along the lap. As the partially formed packet tube progresses under mechanical control from the forming device it passes between synchronized-acting, electrically-heated clamping units which may or may not be fitted with the embossing dies. As this heated clamp closes to form and heat-seal the bottom of the packet the delivery head releases the volumetrically measured portion of product to be packaged into the forming tube and hence into the partially formed transparent packet.

In that interval of time the sealing and imprinting of the bottom of the packet is complete, the heated clamp automatically releases, the filled portion drops the length of a finished packet, the clamp automatically closes, and heat-seals the top of the first packet and the bottom of the succeeding one. This forming, filling and sealing action continues automatically as long as the supply of product or packet forming material lasts or until the machine is stopped. A synchronized activated knife severs the first packet from the second while the third packet is being formed and filled; the cut edge may be straight or serrated. This relationship of operations continues as long as the machine is in operation. Each machine has two packet-making units which operate simultaneously.

The machine can be adjusted to form packets of varying diameters and shape of cross-section in about a half hour.



A COMPLETE unit occupies a floor space area of 8 ft. square and has an overall height of 8 ft. 10 in. It may be a unit in a straight-line production set-up and may be arranged in batteries operating under the supervision of one mechanic for twelve machines. One skilled packer can inspect and otherwise take care of the output of one machine, especially when the packing is in bulk corrugated paper cartons. Otherwise it is better to have the machines deliver onto a packing belt around which the required number of girls can be grouped to do the type of packing required by the container used. Power requirement for each machine is ½ hp.

When hard candy or other moisture absorbing products are being packaged it is almost imperative that the packet making and filling be done in a room conditioned both for temperature and humidity.

Machines may be operated individually or in batteries with a packer for each machine unless machines deliver to a packing table conveyor. When operating on hard candy or other moisture-absorbing materials room air conditioning is essential.

PROMOTING *the Product . . .*

This car card, which reaches a daily audience of sixteen million, is part of the million-dollar promotional job launched by California Fruit Growers' Exchange to dispose of the heaviest Valencia crop on record. The advertising features "25 per cent more oranges for your money." Ninety-two newspapers, nineteen radio stations and outdoor and express-wagon posters will be used, in addition to the regular Sunkist advertising, to give a total of 1,750,000,000 advertising impressions. A booklet, from which the above illustration was taken, is issued to dealers.

▶ INDIA TEA BUREAU, New York, introduced last month a contest to promote iced tea. The prizes, totaling $6,800, will be given for the best twenty words on why iced tea is the favorite summer drink.

▶ OYSTER GROWERS' AND DEALERS' ASSOCIATION of North America, Inc., New York, will spend $100,000 in newspapers and other media, beginning around Sept. 1. Financed by small voluntary assessments, the campaign will stress the health value and "economy" of oysters and publicize new ways of serving them.

▶ NATIONAL CANNERS' ASSOCIATION, Washington, has distributed a leaflet, "Canned Food Facts," giving fifteen interesting and practical highlights on food in tins.

▶ WISCONSIN CHEESEMAKERS' PUBLICITY ASSOCIATION has voted to adopt a brand name to identify Wisconsin cheese.

▶ INTERNATIONAL ASSOCIATION OF ICE CREAM MANUFACTURERS, Washington, has issued a helpful booklet, "The Driver's Part Toward Building Good Will."

▶ NATIONAL CONFECTIONERS' ASSOCIATION, Chicago, recently circulated among members a long list of summer dessert recipes having candy as the main ingredient.

▶ NORTHEASTERN POULTRY PRODUCERS' COUNCIL will hold a poultry industries exposition in New York, Feb. 3-8. The first of what is to be an annual show, the exposition is expected to help "vitalize" the industry.

▶ MONROE, Wis., recently staged a Swiss cheese golf tournament financed by cheese houses of the city.

▶ TANNIN CORP., New York, is publishing "The Blackboard," a four page monthly paper for licorice users. It contains hints on candy merchandising, formulas and other information.

▶ PABST-ETT CORP., Chicago, has announced a baseball contest, offering 5,000 balls as prizes to children for the best letters on what position they like to play on a baseball team. Half-page ads in 28 metropolitan comic sections will put over the contest.

▶ NEW YORK STATE'S milk advertising campaign got under way last month in 132 daily and 567 weekly newspapers. Copy stresses the value of calcium content of milk, its effectiveness in reducing, its value as an "energizer" its low cost and its high food value.

▶ NATIONAL SUGAR REFINING CO. of N. J., New York, has developed a counter display of fruits, vegetables, home canning facilities and Jack Frost sugar to promote the product in home food processing.

▶ AMERICAN SUGAR REFINING CO. recently released an intensive summer advertising campaign in 185 newspapers. Copy stresses virtues of the company's line of pure cane sugar for home canning.

▶ BORDEN SALES CO., INC., New York, is offering a complete merchandising plan to fountain managers to increase consumption of Thompson's malted milk. Eye-catching window posters and strips, enticing back-bar displays and bright, snappy menu tabs are included in the plan.

▶ CURTISS CANDY CO., Chicago, suggests the use of one of its bars for making ice cream sundaes. A slip enclosed in the wrapper gives details.

▶ SEEMAN BROS., INC., New York, has coined the caption, "a pitcher of coolness," for car cards and point-of-sale ads which illustrate a pitcher and glasses of iced tea. "White Rose" tea advertising also uses display cards with the slogan, "Hang the heat!", the cards having a real thermometer attached to them.

▶ HECKER-H-O CO., INC., Buffalo, is giving a tumbler free with two packages of "Force." The tumblers picture the radio character, "Bobby Benson."

▶ PILLSBURY FLOUR MILLS CO., Minneapolis, has renewed its radio program, "Cooking Close-ups," over the WABC-Columbia networks on Wednesday and Friday forenoons.

▶ CALIFORNIA & HAWAIIAN SUGAR REFINING CORP., San Francisco, is offering a free ten-day vacation in Hawaii for the best 100-word statement telling "Why I prefer C & H pure cane sugar."

▶ CAMPBELL SOUP CO., Camden, N. J., has engaged Lionel Barrymore for five years to portray "Scrooge" on the radio each Christmas. This will be over a nationwide CBS hook-up.

▶ AMERICAN LIME CORP., New York, has prepared a 22-page pocket-sized booklet entitled, "Cocktail Memoirs of Fresco Lime." It gives recipes for many drinks.

Diesel Power Generation Cuts Milk Delivery Fleet Costs

Truck-type engines drive generators supplying all electric current needed by dairy for power, light, and battery charging

By BIRNEY MILLER
Larchmont, N. Y.

WHEN a capital investment will repay itself in less than fifteen months it sounds interesting. When this saving represents an 84 per cent cut in power costs which in turn reduces the direct operating costs of a delivery fleet, the proposition becomes doubly attractive. The Borden Farm Products Company of New York have had this pleasing experience at their West 49th Street distributing branch.

This building has two floors. In addition to a milk distribution station it provides room for 39 electric trucks, 150 horses and a number of gas trucks, all for route work. The total floor space is approximately 100,000 sq.ft. Bottled milk is delivered to the station in trailers and is distributed throughout this section of the city in electric, horse or gas delivery units.

The power load consists of the lighting needs of the branch, including the offices, garage, stables and shipping rooms, and the larger needs represented by the electric truck charging load and some electric equipment in the garage and building. The lighting load varies according to the time of day and weather conditions. The charging load is the heaviest. It is fairly constant, although winter driving conditions may increase it for short periods.

Total annual power consumption is about 250,000 kw.-hr., divided roughly between lighting and charging in the ratio of one to two. This load is heaviest in the late afternoon and evening when the trucks are on charge and lightest between 7 and 11 a.m. when the load is principally for partial lighting of the building.

Due to local conditions the cost of power is unusually high in Manhattan, averaging for this plant $.0375 per kw.-hr. The management recognized the potential savings on this cost item and it was not difficult to sell them on the idea of a private power-generating plant. It was felt that only in this way could the full economic advantages of their electric trucks be realized. The installation was therefore made in December, 1934, and has been in operation since March, sufficiently long to provide some operating data and costs.

The power unit consists of two 55 hp., 4-cycle, 4-cylinder, 4⅞ in. x 6 in. automotive-type diesel engines, driving two 30 kw., d.c. generators, direct-connected. The two engine-generator units are mounted on a single, structural iron frame which rests on a cork base supported by a concrete foundation.

The engines are equipped with air filters and supervising gages. Each is cooled with water circulating through a radiator. They are started with a motor and a battery which floats on the generator at all times, so that it is never discharged. A 3,000-gal. tank, located in the engine room, provides fuel for both engines by gravity.

THE generators are specially designed to maintain constant voltage within 1 per cent under varying load conditions. Through a special, inherent design each generator can take current from the other without reversing its polarity. The circuit is 230-115 volt, 3 wire, d.c., similar to that served by the utility company which now supplies current a few hours daily for lighting purposes only. Each generator has its own switchboard with proper controls.

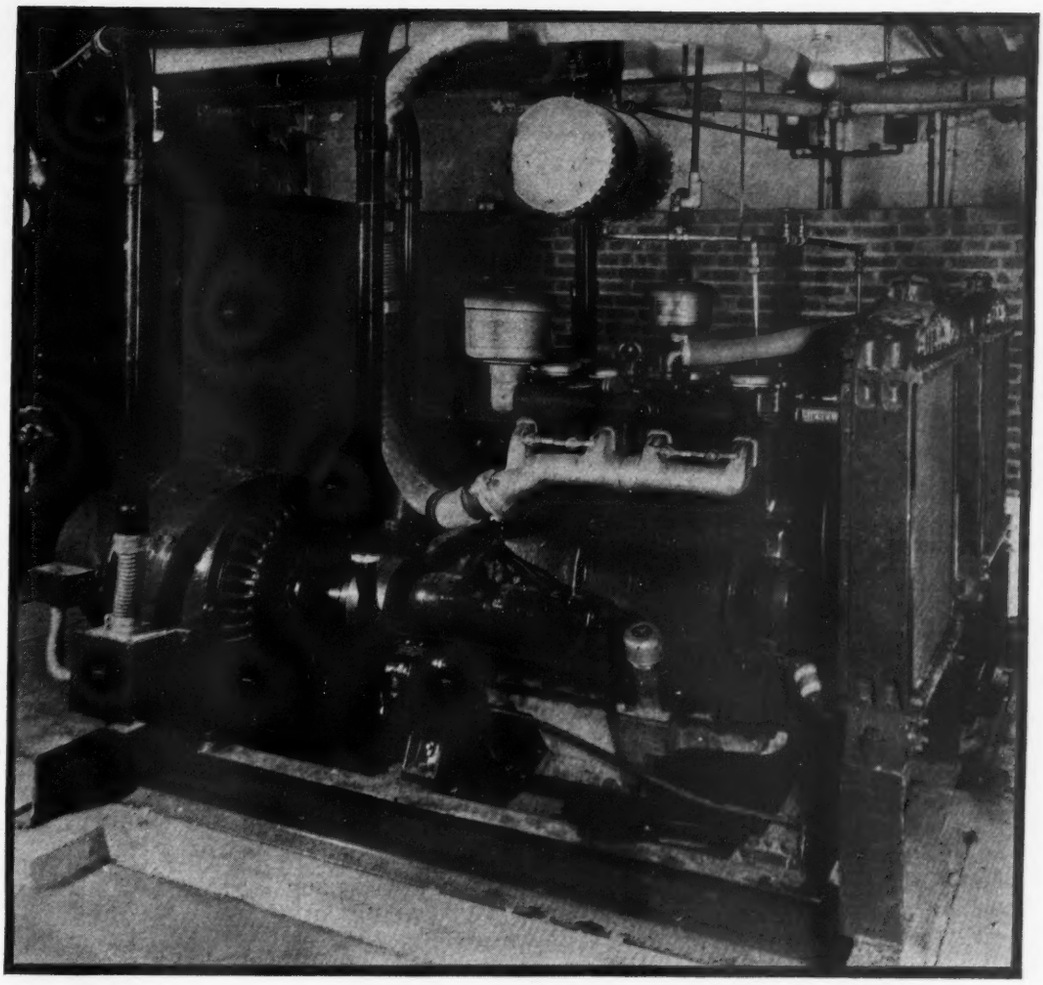
These units are entirely automatic, but are operated only in a period when regular auto mechanics are on duty. No regular attendance is required and the supervision is limited to periodic checks throughout the day in the spare time of one man. About fifteen minutes is required to change oil and clean the filter in the crankcase every 100 operating hours and a moment from time to time to clean the air filters. The generators are oiled every three months. The operating labor requirement is therefore negligible.

The actual operating period is from eighteen to twenty hours per day between 11 a.m. and 7 a.m. Between 7 a.m. and 11 a.m. the load is mostly for lighting and because of the small demand it is switched to the public utility circuit by means of a double-throw switch which permits throwing the load to either source desired.

The electric trucks start coming in by noon and by 1 p.m. they start going on the charging line. From this time until 10 p.m., the trucks are staggered on the line until all are charged, the maximum load at any one time being 26 trucks. The daily demand per truck is from 10 to 15 kw.-hr., making a maximum demand per day from this source of about 600 kw.-hr.

Operating speed of the engines is 1,200 r.p.m., at which speed they develop enough power to give a maximum generator output of 30 kw. each. By use of a sensitive built-in governor, a practically constant speed is maintained even when the load is thrown on or off in one step. Exhaust gases are passed through a silencer into a vertical flue.

Several safety measures are provided. The generating set is located in the same room with two oil-burning boilers, one of which provides heat and the other hot water to the building. A switch outside this room permits everything in the room to be shut down in case of an emergency without need for entering the room itself. A ceiling light in the room is connected with the battery and burns constantly. It furnishes sufficient



Two automobile-type Diesel engines generate all the current used by dairy company for power-lighting and recharging the batteries of a fleet of storage-battery electric milk delivery trucks

light so that when the generating unit is shut down it is not necessary to switch to utility service. These features coupled with the governing devices built into the engines make the unit safe and free from hazard under conditions which can be foreseen and are a tribute to the careful planning and the unusual foresight exercised in making this installation.

The total cost for this unit including fuel tank, materials and all labor is well under $10,000.00. The fuel cost is characteristic of diesel plants. Fuel oil consumption averages one gallon per 11 kw. At $.06 per gallon the fuel cost per kw. is $.0054. Regular automotive lubricating oil is used in the crank case and is changed every 100 operating hours, without subsequent additions. The cost for this item is $.0006 per kw., giving a total cost of $.006 per kw.

With an estimated yearly output of 250,000 kw.-hr. the annual operating expense of this unit will be $1,500, assuming no change in the cost of oil. At the former power rate of $.0375 the annual power bill for 250,000 kw.-hr. would be $9,375. The net saving with the present unit will be $7,875. This is an 86 per cent return on the investment and enough to completely pay for the plant in fourteen to fifteen months.

Reduction in current cost from $.0375 to $.0060 saves $.0315 per kw.-hr., or 84 per cent of the former cost. Assuming a minimum daily consumption of 10 kw.-hr. per truck the annual saving amounts to $115 per truck and $4,600 for 39 trucks. Since 10 kw.-hr. is a minimum consumption, the actual saving probably exceeds $5,000 for the fleet.

When trucks can be operated for a daily power cost of from $.06 to $.10, then indeed electric truck operation is attractive. Undoubtedly this experience will appeal to many who have not been able fully to capitalize their electric truck advantages because of high power costs and will interest still others who have been unable to use electric trucks at all because of this factor. This installation also holds much of interest to those who desire cheap power for lighting purposes only or for other needs than charging trucks. Many food plants operate industrial trucks which require current.

NO provision has been made in figuring the above savings for annual repair and maintenance costs or for writing off the investment. This is considered unnecessary in view of the large returns on this investment which are ample to meet all future charges and still leave large savings.

This company's experience points the way to lower fleet costs for many other milk companies and for some bakeries to mention only two possibilities in the food industries. Outside this industry the field is as broad, and the trend to such power units will probably grow as the possibilities become better known.

Combination Fuel-Refrigeration System *for Food Trucks*

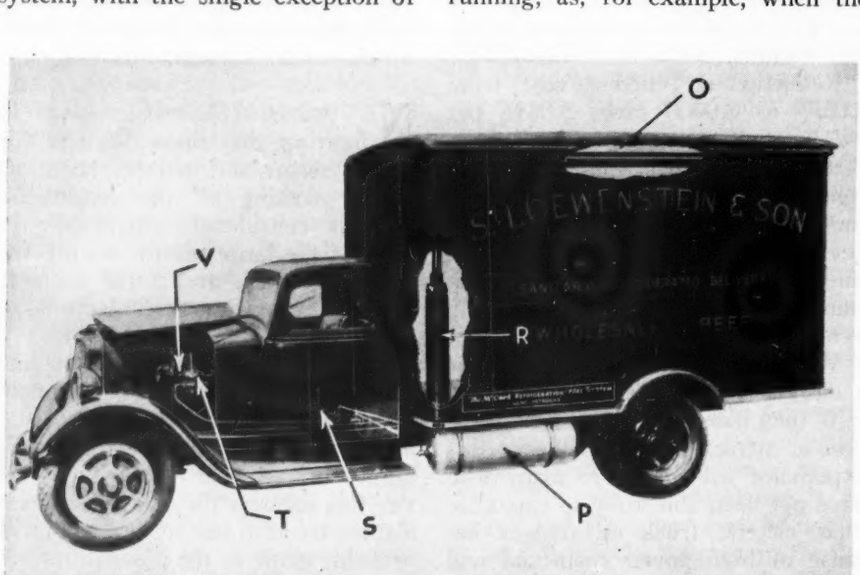
Propane cools body and takes place of gasoline

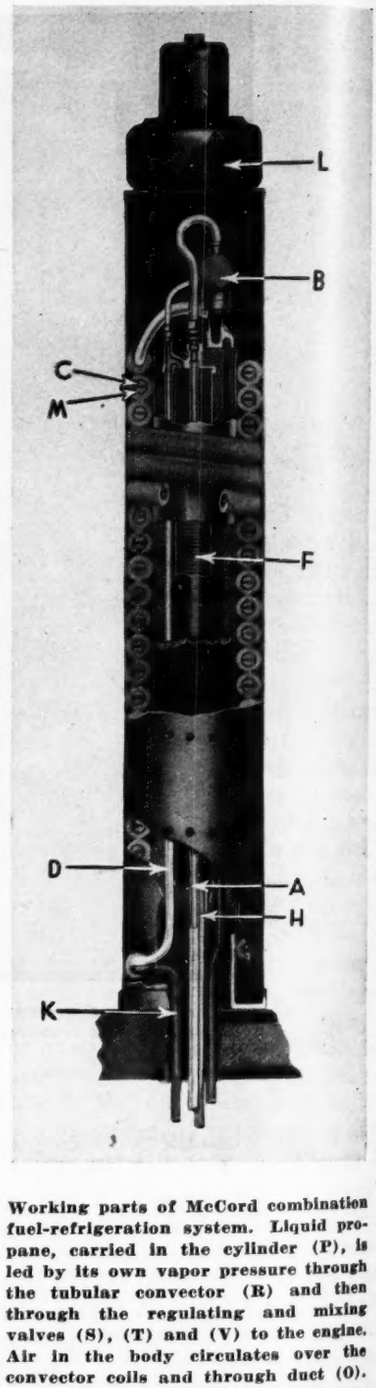
IN THE trend toward the use of refrigerated truck bodies for handling all kinds of food products, many refrigerating means have been utilized, one of the newest of which is the McCord combination fuel-refrigeration system. Unlike refrigerants, such as solid CO_2, wet ice, salt ice, brine and jell plates, and unlike mechanical systems, the refrigerating medium (liquid propane) employed in the McCord system is utilized first to provide body refrigeration and then to operate the truck engine.

Once installed, the system has no further refrigeration expense, since the refrigeration is obtained as a by-product from the fuel which runs the truck engine. Maintenance expenses are reduced to a minimum since the system, with the single exception of the air-circulating fan (L) on the top of the convector, has no moving parts.

In the McCord system, refrigeration is provided in direct proportion to the fuel demands of the engine. An excess of refrigeration may be produced on runs where the engine is under load for the greater part of the time. With a thermometer inside the body, this excess refrigeration may be controlled by holding the doors open longer than usual on stops or shutting off the engine on short stops. On ordinary service, however, the hold-over of the evaporator and of the load itself is sufficient to keep the temperature of the truck body within safe limits.

When the truck body has to be refrigerated when the engine is not running, as, for example, when the





Working parts of McCord combination fuel-refrigeration system. Liquid propane, carried in the cylinder (P), is led by its own vapor pressure through the tubular convector (R) and then through the regulating and mixing valves (S), (T) and (V) to the engine. Air in the body circulates over the convector coils and through duct (O). In the convector (above), propane passes through tube (A) of the heat exchanger (F), where its atmospheric heat is removed. It then passes through expansion valve (B) into the evaporator tube (C) as saturated gas at a pressure of approximately 5 lb., and in the conversion to dry gas, heat is absorbed. Air passes through openings in the sides and bottom of the outer sheathing, over the low-temperature coils, and is circulated by the motor driven fan (L) through the cold air duct (O). The dry gas is then led from the evaporator through tube (D) to the top of the heat exchanger, where in its spiral descent, it absorbs the atmospheric heat from incoming liquid fuel. To cool the truck when the motor is not operating, as during loading or night stop-over, the circuit H-M-K is provided; it permits circulation of any cooling medium.

truck is being loaded in the morning or during a night stop-over, an extra circuit, shown as (HMK) in the cutaway view, has been provided to permit the circulation of any other cooling medium.

Generally speaking, the cost of propane may be considered as being competitive with gasoline. When comparing their prices in tank car lots, propane runs somewhat under gasoline at the present time, but as with gasoline prices fluctuate from week to week.

THE Shell Company is now serving Petrogas (trade name for the propane which it produces and markets) in the Chicago area in tank-truck deliveries at a price which is competitive with tank truck deliveries of regular gasoline. The same company also sells Petrogas in interchangeable cylinders at a price per gallon which is competitive with the filling-station price of gasoline.

In New Jersey, Maryland, Delaware and certain other parts of the East, Sun Oil Company, through its subsidiary, Solgas, is marketing the propane fuel in tank truck dumps of 1,000 and 2,000 gal. at a price of 5 cents per gal., f.o.b. Marcus Hook; 6 cents per gal. in that part of New Jersey within a 50-mile radius of Marcus Hook; 7 to 7½ cents per gal. in Newark, Jersey City, Harrison, Hoboken, and so on. It also sells propane in interchangeable cylinders at a price competitive with the filling-station price of gasoline.

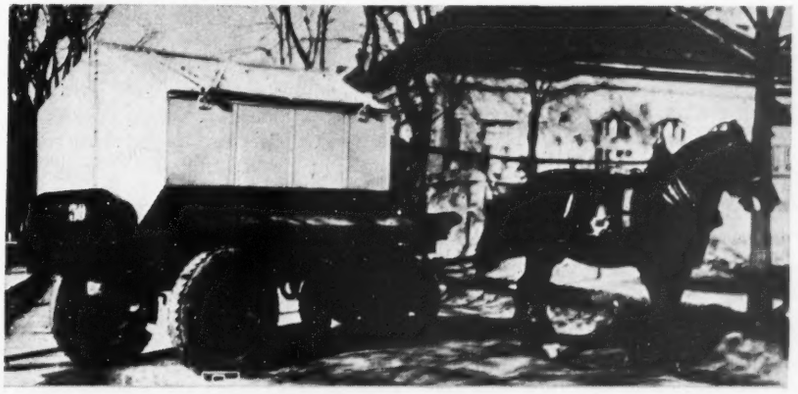
The theoretical B.t.u. content of propane is somewhat under that of gasoline on a volumetric basis, but the way gasoline is used in most conventional carburetors maximum efficiency is seldom reached under practical operating conditions. This is due to the boiling point of gasoline being considerably above normal summer temperatures and to the fact that gasoline is very seldom a perfectly dry gas when it is admitted into the engine manifold. Propane, on the other hand, has a final boiling point of minus 40 deg. F. and becomes a dry gas at higher temperatures. When it reaches the engine manifold, it is in a form to permit of maximum combustion efficiency.

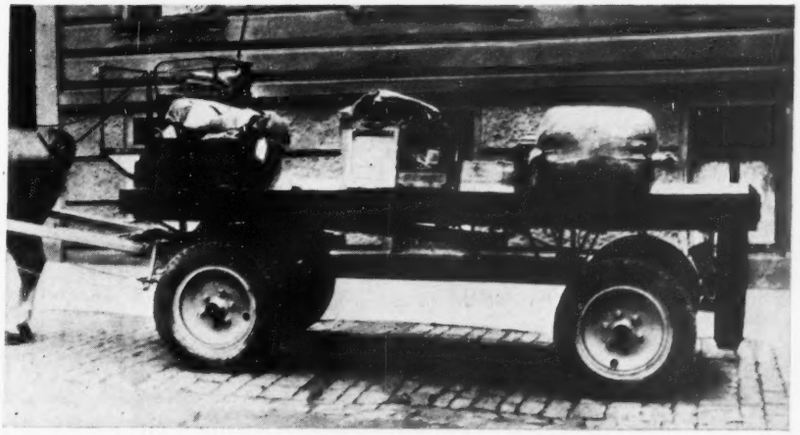
Because of the dryness of the propane gas, a much more even distribution of the fuel charge to the cylinders is claimed with propane than with gasoline. This helps to bring the efficiency of propane to about the same level as that of gasoline on a volumetric basis. Propane has an octane rating of 125 and when the compression ratio of the engine is raised, its efficiency is still further increased.

IT IS not necessary to make any changes in the conventional gasoline engine in order to utilize propane, although greatly increased efficiency can be obtained if the compression ratio is raised. On some installations on standard engines, the propane mixing valve may be mounted in parallel with the gasoline carburetor in such a manner that the operator may shift from one fuel to the other at will.

More on Pneumatic-Tired Wagons

SUBSEQUENT to the pioneering reporting of the development of pneumatic-tired milk route wagons as published in FOOD INDUSTRIES in 1934, come the results of similar tests of pneumatic-tired wagons fitted with SKF anti-friction bearings in Europe. These tests show that the elimination of friction through the use of such bearings has resulted in increased loads or lighter horses; lessened strain on the horses and considerably reduced lubricant cost and maintenance expense.





At the top, a refuse collection wagon as used in Budapest, Hungary. Below, a similarly equipped wagon used for general delivery purposes. Both are fitted with pneumatic tires and disk wheels carried on anti-friction SKF bearings. The refuse wagon is pulled by one horse. Previously, before equipped as shown above, it required two horses, and in snowy weather, four horses. With the more silent pneumatic tires, the condition of the horses has improved and their weight increased. To prevent their getting too fat, their portion of oats has been reduced.

Practical Problems of
TRUCK TRANSPORTATION

DISCUSSED BY EXECUTIVES IN THE FOOD INDUSTRIES

Is Preventative Motor Truck Maintenance Worth While?

Question No. 12

1. Does it pay to set up some form of preventative motor truck maintenance in the operation of a fleet in the food field?

2. Of what should this preventative maintenance consist?

3. Are periodical inspections the backbone of what you consider adequate preventative maintenance to be?

4. If so, at what mileage or time intervals should such inspections be made?

5. What records or paper-work do you consider are essential to follow through on the procedure of preventative maintenance that you favor?

Pays For Itself

PREVENTATIVE motor truck maintenance will certainly pay for itself. With adequate and complete maintenance, some of our bakery operators have been able to reduce their spare trucks from about one to eight to one for every fifteen, thereby saving the cost of depreciation, licenses, insurance and interest on investment which goes on when trucks are laid up for major repair or overhauling jobs and extra trucks have to be employed. One garage has taken for itself a pet accounting slogan and says, "It is better to keep up than to catch up."

Preventative maintenance should consist of periodical examinations of the running mechanism. While mileage would be the best gage, the difficulty in having the maintenance men observe the mileage and do the work when the elapsed distance has been covered has made it necessary to set the periodical examinations on a basis of time intervals. These time intervals are as follows:

Daily	Semi-Weekly	Weekly		Monthly
		Long Haul	*Short Haul*	
Tires				Transmission
Gasoline	Grease	Grease		Differential
Oil	Batteries	Batteries		Complete check-up
Water				

For preventative maintenance, the best recording routine has been a reversion to the old blackboard system. Of course, for regularly needed repair the garage has its car repair cards, tire changes are recorded on the tire mounting slips, while the issuance of gasoline and oil is covered by the garageman's daily service report. But on overhauling, a large blackboard with truck numbers listed down on the board and spaces provided across the board for as many semi-weekly overhauls as are required in a month, plus the monthly check-up, seems to serve best. Into these large blocks, often 3x8 in., the chief mechanic notes the dates of the month that he wants the semi-weekly, weekly, and monthly check-ups done. Naturally, on a large fleet the work must be distributed over the entire week. In large garages the chief mechanic or superintendent has a stores issue clerk or cost clerk who does the posting, while in smaller garages, probably some clerk from the office will take care of the blackboard, collect the car repair cards, tire mounting slips, and garageman's service report. The maintenance men, as they do their check jobs, place their initials in chalk after the date when the work was to be done. In the event that because of a larger amount of repair work a certain car is not taken care of on the day designated, then the maintenance man should indicate the date the work was actually performed.

At the outset, such a routine can hardly be expected to operate 100 per cent, but as the chief mechanic gets to know the mileage and performance of various trucks, he can better distribute the work.

While the issuance of oil is listed as a daily check-up job, oil changes depend on the local garage, whether or not they want to make a complete change of the entire fleet on one certain date or on certain mileage and also whether or not they re-process used oil.—JOHN THIES, *Manager Accounting Service Department, Quality Bakers of America, New York, N. Y.*

Important for Economy

REGARDING preventative motor truck maintenance, I believe this is THE most important phase of truck economy. Answering your questions, it is more than worth while, it is essential:

1. It certainly pays big dividends in truck lay-ups and peace of mind to practice preventative maintenance.

2. This should consist of greasing on a mileage basis, daily checking of oil, water, and lubricants, weekly checking of battery, daily checking of tires. Continuous checking of gasoline mileage to learn of unseen troubles. Mileage checking of spark plugs, mileage checking of valves, season checking of bearings, seasonal cleaning of radiator and water jacket. Removal inspection of brakes after second adjustment, and in fact periodical examination of the things that break down, before they break down. The success of the plan depends on laying out a complete plan before starting, and deciding on the number of miles, days or weeks between "adjustments."

3. Regularity is the backbone of breakdown prevention.

4. Manufacturers of accessories often recommend proper intervals.

5. A complete record of truck mileage by days with the total cost of all running and maintenance expense itemized in detail.—A. J. CLAXTON, *Manager, White Mountain Creamery Co., Lima, Ohio.*

Monthly Inspection Favored

IN REPLY to your questions:

1. We feel that it does pay to set up some form of preventative motor truck maintenance.

2. Preventative maintenance would consist of trucks being properly greased

Next Month's Question

QUESTION NO. 13

What Are the Best Methods for Reducing Truck Accidents?

1. What fundamental practices have you found essential in reducing truck accidents?

2. Do safety committees, company traffic courts, or safety contests with buttons or cash prizes really help to reduce accidents?

3. Does it pay to give drivers who have had accident time-off without pay instead of discharging them?

4. What percentage of accidents in your truck fleet has been due to mechanical failures?

5. Of what value in reducing accidents are mechanical or electrical directional signals?

at proper intervals, and inspected regularly.

3. The motors should be inspected thoroughly once each month, and in addition to this inspection the driver should make an inspection weekly and report any trouble, regardless of how small.

4. To be inspected very thoroughly by a competent mechanic every 2,000 miles.

5. Have drivers make out inspection card and keep on file for future reference.—R. L. INGRAM, *Superintendent, Newton Packing Co., Detroit, Mich.*

Records Not Needed

PREVENTIVE motor truck maintenance we feel does pay. Every 500 miles, when our trucks are greased, the trucks are tightened up and examined while on the grease rack for loose bolts and anything that might cause trouble later on. Batteries are examined and water added once each week. We do not keep any records on the procedure of preventive maintenance.

For plants that do not have a garage where complaints can be filed immediately and defects corrected, we would favor more detailed preventive maintenance and further tests.—IRVING O. KOCH, *Borden's Dairy & Ice Cream Co., Columbus, Ohio.*

Greasing Important

REGULARLY each year we go over our trucks thoroughly and replace with new parts any that are worn or broken. This is a thorough job. We do not resort to any guess work, and it is not the kind of a job where, in going over the truck, one might conclude and say, "well that will last (maybe) a few months." We also see that the man who is responsible for the greasing and washing, properly greases the truck, thereby saving many dollars in worn-out parts. It is my thought to emphasize the fact that through proper greasing it never becomes necessary for our mechanics to use heat to remove any of the parts on our trucks. We operate eighteen or more trucks and have had very few tie-ups with them. This naturally is due to trucks being properly cared for.

We make daily inspection of our trucks and ask our drivers to report on a form each day whatever the condition of the truck is, whether good or bad.

We also have cards to indicate the mileage run, the oil and gas used, the kind and weights of loads, the date on which they are greased and washed, also the money expended for maintenance of each truck. Following through our record to head office transportation department, we are checked and advised if we are at all out of line with the other plants of similar size.

Summing up, with proper repairs and an annual overhauling, and proper greasing and washing at regular intervals, we feel that we have no occasion to worry about tie-ups when we get into the peak months. Unless we have a bad accident, which to date we are proud to state has never occurred, recognition of good chauffeur driving mileage is given to all truck operators in the form of a bonus which is paid once a year and the truck operator who does have an accident or mishap is penalized in such a way that it reduces his bonus for no accident mileage.

Our entire fleet is equipped with mechanical refrigeration—W. J. DESMOND, *Manager, General Ice Cream Corp., Hartford, Conn.*

Inspects Every Thousand Miles

IN REPLY to your questions concerning preventative maintenance:

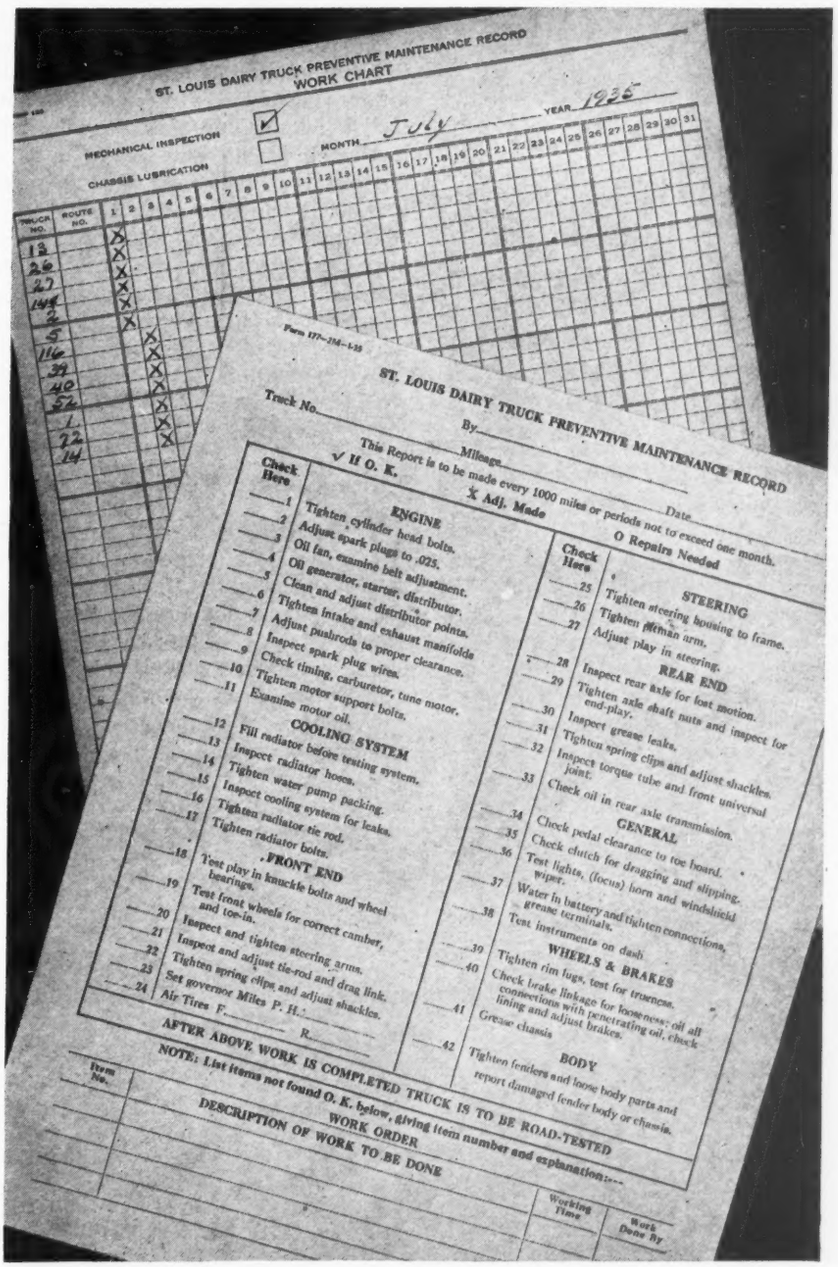
1. It does pay and we have been operating in this manner since 1925. I think the St. Louis Dairy was one of the first, if not the first, to install accident preventative maintenance.

2. Preventative maintenance should consist of: (*a*) Periodic inspections every 1,000 miles operation. (*b*) This consists of 42 to 48 specific operations pertaining to chassis, motor and body. (*c*) Simplified records.

3. Periodical inspections are the backbone of adequate preventative maintenance.

4. Experience from tests we have conducted indicates that inspection at 1,000 mile intervals is most desirable.

5. Records shown herewith we consider essential to follow through on our procedure.—EDWIN A. KAYSER, *Vice-President, St. Louis Dairy Co., St. Louis, Mo.*


ST. LOUIS DAIRY TRUCK PREVENTIVE MAINTENANCE RECORD
WORK CHART

MECHANICAL INSPECTION
CHASSIS LUBRICATION
MONTH July
YEAR 1935

ST. LOUIS DAIRY TRUCK PREVENTIVE MAINTENANCE RECORD

Truck No. _____ By _____ Mileage _____ Date _____

This Report is to be made every 1000 miles or periods not to exceed one month.
✓ If O. K. X Adj. Made O Repairs Needed

ENGINE
1 Tighten cylinder head bolts.
2 Adjust spark plugs to .025.
3 Oil fan, examine belt adjustment.
4 Oil generator, starter, distributor.
5 Clean and adjust distributor points.
6 Tighten intake and exhaust manifolds
7 Adjust pushrods to proper clearance.
8 Inspect spark plug wires.
9 Check timing, carburetor, tune motor.
10 Tighten motor support bolts.
11 Examine motor oil.

COOLING SYSTEM
12 Fill radiator before testing system.
13 Inspect radiator hoses.
14 Tighten water pump packing.
15 Inspect cooling system for leaks.
16 Tighten radiator tie rod.
17 Tighten radiator bolts.

FRONT END
18 Test play in knuckle bolts and wheel bearings.
19 Test front wheels for correct camber, and toe-in.
20 Inspect and tighten steering arms.
21 Inspect and adjust tie-rod and drag link.
22 Tighten spring clips and adjust shackles.
23 Set governor Miles P. H. _____
24 Air Tires F. _____ R. _____

STEERING
25 Tighten steering housing to frame.
26 Tighten pitman arm.
27 Adjust play in steering.

REAR END
28 Inspect rear axle for foot motion.
29 Tighten axle shaft nuts and inspect for end-play.
30 Inspect grease leaks.
31 Tighten spring clips and adjust shackles.
32 Inspect torque tube and front universal joint.
33 Check oil in rear axle transmission.

GENERAL
34 Check pedal clearance to toe board.
35 Check clutch for dragging and slipping.
36 Test lights, (focus) horn and windshield wiper.
37 Water in battery and tighten connections, grease terminals.
38 Test instruments on dash.

WHEELS & BRAKES
39 Tighten rim lugs, test for trueness.
40 Check brake linkage for looseness; oil all connections with penetrating oil, check lining and adjust brakes.
41 Grease chassis

BODY
42 Tighten fenders and horne body parts and report damaged fender body or chassis.

AFTER ABOVE WORK IS COMPLETED TRUCK IS TO BE ROAD-TESTED

NOTE: List items not found O. K. below, giving item number and explanation:—

WORK ORDER

Item No.	DESCRIPTION OF WORK TO BE DONE	Working Time	Work Done By

Two of the forms used by St. Louis Dairy Co. in its preventative maintenance practice.

IDEAS
from Practical Men

Short-Proof Plug

THE plug end of an extension cord is the weakest part. It must be repaired many times during the life of the cord. Perhaps the most frequent cause of trouble with these plugs is that the screws become loose, permitting the wires to short. Or there may be a short at this point because of loss of insulation. At any rate, there are more fuses blown because of shorts at the plug ends of extension cords than for any other single cause.

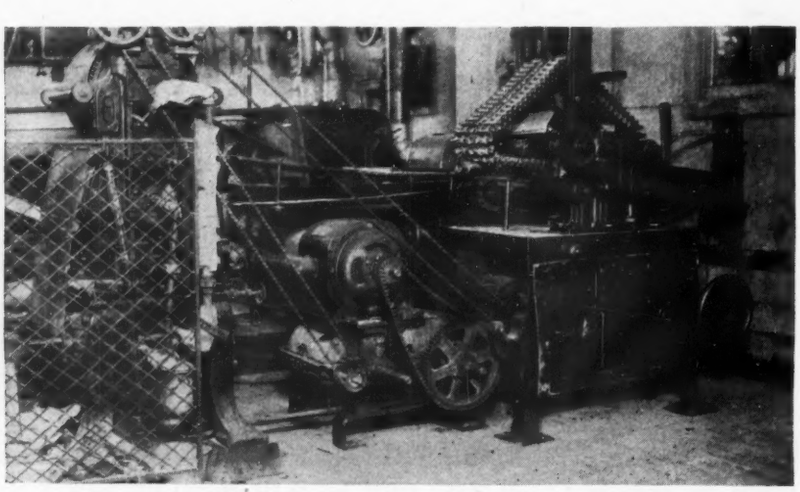
Extension cord plugs can be made absolutely short-proof with a little sealing wax. After the screws have been securely tightened, the space between and above them is filled with sealing wax, or even with candle wax or tallow. A plug safeguarded in this manner will outlast the cord.—N. T. PEF, *Chicago, Ill.*

Variable Speed Drive

MANY machines have conveyors and other parts driven from one motor, while at the same time it is desirable to control relative speeds between the different parts independently. Such control can be effected by making use of some of the designs of variable speed units that are available on the market. The following brief explanation of how this is accomplished by one concern will illustrate the method.

The photograph shows a plastic candy machine at the plant of the Edward M. Becker Co., Cleveland, Ohio. It is driven by a single motor and there are two drives—one for the belt carrying the dies and one for the feeder belt. The owner conceived the idea of inserting a variable speed control unit in each of these drives, to regulate the speed at which strips are fed to the dies. This provides for the difference in speed at which the dies can handle different kinds of batches. As the speed of the dies determines the rate at which the machine can take material, it is obvious that the feed must be synchronized with the die speed.

Both speed control units are driven by roller chain from the motor to the constant speed shaft of the unit. The two belts for handling the candy are driven from the variable speed shafts. Speed control is by means of hand wheels.—FRANCIS A. WESTBROOK, *Center Conway, N. H.*

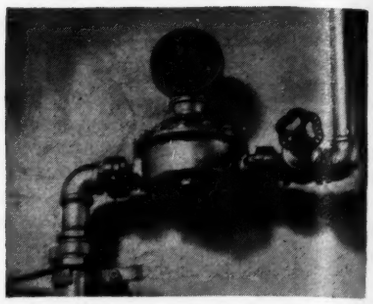


Two variable speed control units with one drive motor.

Flow Meter Measures Syrup

ONE example of what can be done with a flow meter in a food plant is the use to which the instrument is put by Vogt's Ice Cream, Inc., New York, N. Y. This company uses sugar syrup in its mix, storing it in a 1,700-gal. overhead tank.

When the mix is being prepared, the operator opens a valve in a pipe leading from the syrup tank to the pasteurizer, keeps an eye on the flow meter in the line, and closes the valve when the correct amount of syrup has flowed by gravity into the mix.



Flow meter mounted in syrup line.

The flow meter has a totalizing indicator similar to that of a gasoline pump. This gives a quick and accurate reading. There is also a second totalizer, similar to an automobile odometer, recording the grand total of gallons passing through the meter.

This application of the flow meter has obvious advantages in time saved, accurate control of mix, and recording of total amount of syrup used.

Preheating Brine Water

THE operating cycle of brine mixing and heating tanks in canning plants can be shortened considerably if the water used for brine making is preheated.

To do this, one large plant uses a storage-type hot water heater to furnish water to the brine room. This water, practically at the boiling point when run into the mixing tanks, eliminates the time element involved in heating cold water.

To avoid any excessive investment charges incidental to the larger, specially plated, brine mixture heating coils required for use with exhaust steam, high pressure steam is used in the brine room. Inasmuch as waste exhaust steam is available to preheat the brine water, an appreciable reduction in the live steam demand is obtained.

If a storage heater is installed to furnish water for wash rooms or other uses, it is often possible, where peak demands do not coincide, to use this heater as a brine water preheater. In the plant under consideration, this was the case. With the addition of a small amount of heating surface, a heater previously used to supply hot water for general purposes has capacity enough to supply both demands.—S. H. COLEMAN, *Waynesboro, Va.*

NEW EQUIPMENT
for Food Manufacturers

Laboratory Homogenizer

To provide a power-driven homogenizer suitable for laboratory, research and experimental work, Cherry-Burrell Corp., 427 W. Randolph St., Chicago, Ill., has added a small-capacity laboratory viscolizer to its line of factory-capacity viscolizers. As the accompanying photograph shows, the new machine is not much higher than a quart milk bottle. It occupies a space about 3x3 ft., including the motor. Capacity is 25 gal. per hour, and consequently it can be used on small-scale commercial work as well as for experiment-sized batches. The motor is 1 hp., with standard current characteristics, and can be plugged in on the ordinary lighting circuit. All parts coming into contact with the product are stainless steel.

In operation, the machine acts to produce a thorough emulsification, the process being known as homogenization or viscolization. The product enters the stainless steel cylinder block and is pumped under pressures adjustable from 500 to 5,000 lb. per sq.in. through the viscolizing valve to obtain the desired emulsion.

The process is widely used in the food industries for improving liquid and semi-fluid products. Among the products now successfully treated in this way are salad dressing, mayonnaise, processed cheese, coffee cream, ice cream mix, tomato juice, infant foods, evaporated milk and chocolate syrup. With this new machine available to permit small-scale experiments at reasonable cost, it is to be expected that the process will be more widely adopted.

Automatic Self-Priming Pump

For sumps, cellars, isolated water supplies and similar industrial plant services, an automatic self-priming "Monobloc" centrifugal pump has been developed by Worthington Pump & Machinery Corp., Harrison, N. J. This unit embodies a "Hytor," which is a positive primer, placed on the same shaft with a motor and pump. The only special requirement is that the suction line must be reasonably tight. When the pump is primed, a pressure-operated cut-out automatically unloads the Hytor. With this unit there is no recirculation of water, no float, nor any valves to set or give trouble. This design is available for heads from 25 to 150 ft. and in capacities from 50 to 400 gallons per minute. The horsepower range is from 1½ to 5 hp., and the motor is available for either single or multiple phase, 50 or 60 cycle alternating current, and also for direct current.

Small Unit Cooler

For safe cooling in the protection of products, raw materials and process operations, Trane Co., LaCrosse, Wis., has developed a new unit cooler known as a product cooler. This cooler is similar in design to other coolers put out by the same concern, but is especially designed for minimum power requirements and has been made as compact as possible in order to reduce the space needed for its installation. The purpose of the new cooler is to provide small, inexpensive, compact units for use in many places in food manufacture and distribution where cooling will be an advantage but more expensive equipment is not justifiable.

Shaking Mechanism

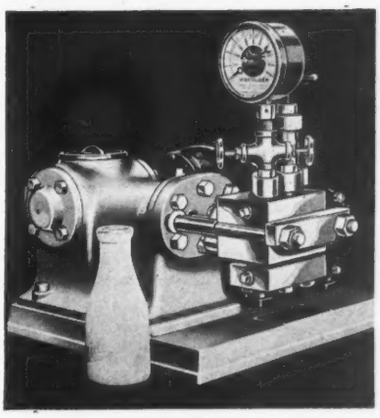
Shaking motion can be imparted to any sieve, screen, conveyor or other unit by means of a device called a "Shaler Shaker," manufactured by Ajax Flexible Coupling Co., Westfield, N. Y. The device consists of two weights geared together so that when one is driven both weights rotate at the same speed but in opposite directions. In design the unit is dustproof, oilproof and fireproof, which is considered an advantage in that the effectiveness of the weights cannot be reduced in any way. The units may be driven by either belt or direct drive and two or more units can be operated in parallel.

Vertical Grinder

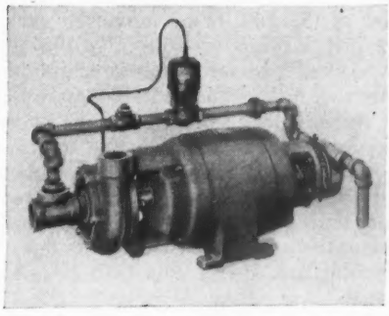
Grinders for large-capacity, low-cost grinding of any type of grain, mixed or separate, byproducts of wheat and corn mills, and food products in process have recently been developed and standardized by Allis-Chalmers Manufacturing Co., Milwaukee, Wis. These compact vertical grinding mills use 16 and 36-in. diameter attrition disks. The lower disk is driven at a comparatively high speed by means of a built-in electrical motor, while the upper disk is stationary and has a central feed opening.

The clearance between these disks is adjustable by means of a hand wheel and after adjustment can be locked. A spring release and manual throw-out lever provides for accidental hard or choke feed. The disk surfaces are made of a special wearing iron alloy.

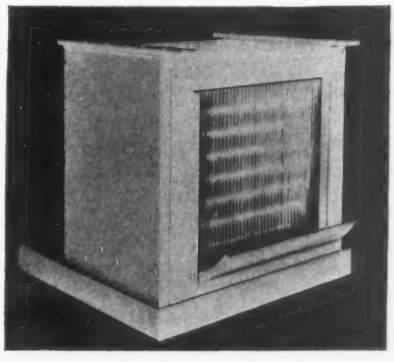
The 36-in. disk machines can be



Laboratory homogenizer or viscolizer.



Automatic self-priming pump.



Small unit cooler.

Shaking Mechanism.

equipped with suitable plates for degerminating corn in the wet milling system used in starch plants.

Cooling Equipment

SEVERAL new sizes of Freon "Balanseal" condensing units and three new horizontal-type air conditioners have recently been introduced by York Ice Machine Co., York, Pa.

The condensing units in sizes from 7½ to 25 hp. increase the number of machines in this series to eighteen. These units are designed for meeting the refrigeration requirements of such installations as produce houses, bakeries and dairies. They are shipped complete with motor, compressor, receiver and automatic control mounted on base. All are designed for use with the refrigerant Freon.

Flow Meter

UTILIZING a variable orifice, a new type of flow meter called the "Isometer," is manufactured by Elgin Softener Corp., Elgin, Ill. In this meter, as the flow of the fluid being measured varies, the orifice opens or closes. In this way a constant pressure drop is maintained and the flow is accurately determined by the amount of orifice opening at any moment. It is claimed that rates of flow as low as 2.5 per cent of meter capacity can be measured with accuracy, and that pulsating flows can be more accurately measured. Errors due to friction are also claimed to be eliminated.

The device consists of two units: An actuator, located in the pipe line, and a meter unit, electrically connected to the actuator and located as desired.

The actuator consists of a flanged section in the center of which is mounted a set of plates, forming a variable orifice. It utilizes full line pressure, either above or below a small piston located in a vertical cylinder. The upstream pressure is transmitted to the bottom of a small pilot cylinder containing a slide valve. The downstream pressure is transmitted to the top of the pilot piston.

Action on this pilot piston caused by the upstream pressure opens the slide valve, permitting the upstream pressure to act on the main piston. This raises it and opens the orifice. The orifice will continue to open until the downstream pressure reaches the desired point, at which instant the pilot piston travels downward and shuts off the pressure under the main piston, the orifice opening being held in a fixed position.

In this way, changes in flow change the orifice opening. The vertical motion of the main piston is changed to rotary motion, operating an electrical time contact device. By electrical means indicating, totalizing or recording meters are operated at any location.

Roll Splitters

FOR splitting any size or shape of roll, Read Machinery Co., York, Pa., have developed a roll splitter which, it is claimed, opens up a new field for bakers. Feed is by hand, and the slit is automatically made in the center of the roll to any desired depth. Adjustments are provided for size of roll and depth of cut. Drive is by motor.

Liquid Mixer

A NEW model of the type E liquid mixer has been added to its line by Patterson Foundry & Machine Co., East Liverpool, Ohio. This new mixer uses the style TD stirrer, as shown in the illustration. It is claimed by the maker that while other mixers have been built using this principle, they have been special machines and that this is the first time that such a mixer has been produced on a standard production basis. Impellers are furnished in various metals to suit the purpose to which the mixer is to be put. Bottoms are flat or dished and the units are furnished jacketed or plain, as desired. Drive may be either from a belt or through the Patterson "Unipower" drive.

Small Welder

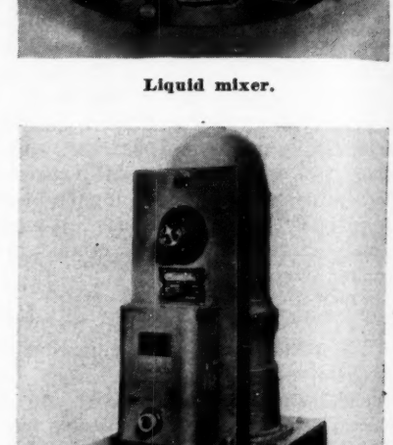
REPAIR arc welding and other welding of thin-gage material is provided for by a small low-priced motor generator type welding machine developed by Lincoln Electric Co., Cleveland, Ohio. Known as the type SA-100, this unit is motor-driven and has a current range from 30 to 125 amperes. The motor is a 5 hp. induction motor for across-the-line starting, using a push button starter switch. The welder is normally furnished for 220 or 440 volts, but can be furnished for 110 or 550 volts, 3- or 2-phase, 60 or 50 cycle, as desired. Dimensions are 20 in. long, 16 in. wide, and 40 in. high.

Control Valve

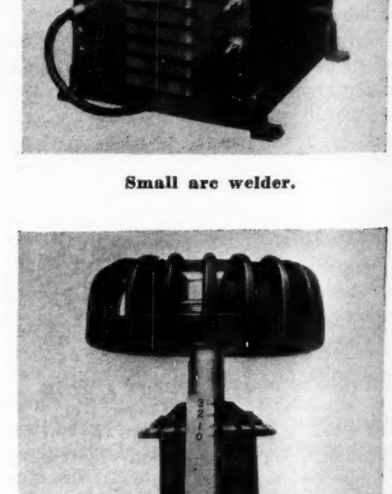
FOR hand control of flow to pipe lines, Hancock Valve Division, Consolidated Ashcroft Hancock Co., Bridgeport, Conn., has recently developed a valve called "Flocontrol." As can be seen from the accompanying photograph, this valve is provided with two scales which show the amount of valve opening. The vertical scale shows the number of complete turns and the numbers on the circular scale show fractions of a turn.

By use of this valve a straight line control of flow is obtained. The flow is always directly proportional to the number of turns of the hand wheel because of the special slotted construction of the valve. Every increment of valve opening in terms of tenths of a turn will vary the flow proportionately, that is, if the valve is set at two turns open then the flow is twice as great as if it is set at one turn.

Liquid mixer.



Small arc welder.



Flocontrol valve.

The Manufacturers Offer . . .

Machine Drives—The economics of individual motor and group drives for production equipment are discussed in a 44-page illustrated booklet issued by Graton & Knight Co., Worcester, Mass.

Corrosion Resistance—Of materials for pea, corn and tomato processing is discussed in technical bulletin TS-8, issued by the development and research department of International Nickel Co., 67 Wall St., New York, N. Y.

Stains—For use in bacteriological laboratories, stains made by Dr. K. Hollborn and Sohne, Germany, are the subject of a recent 40-page booklet published by Pfaltz & Bauer, Inc., 300 Pearl St., New York, N. Y., the American agents for this material.

Mixing and Grinding—Three recent folders of the Patterson Foundry & Machine Co., Liverpool, Ohio, describe the "Typhoon" portable power mixer; the "Unipower" agitator; and "Porox," an acid-resisting, crack-proof material for the construction of grinding balls, lining blocks and cement.

Bakery Equipment—Three folders issued by Bakers Supply & Equipment Co., St. Paul, Minn., describe the following equipment: "Supreme" sifters for all types of flour; bench-type dough brakes of automatic design; and the "Maxima" machine for producing crescent rolls.

Steam Traps—The third edition of Catalog G discussing the design and application of its steam traps has been issued by the Armstrong Machine Works, Three Rivers, Mich.—30 pages, illustrated.

Dairy Supplies—Catalog No. 1578, a 170-page illustrated booklet, covers the complete line of dairy equipment manufactured by the Creamery Package Mfg. Co., 143 West Washington Boulevard, Chicago, Ill.

Salt Flavoring—A booklet entitled "The Selling Power of Flavor," describing a method for the uniform salting of canned foods by means of pure salt tablets, is issued by Scientific Tablet Co., Belleville, Ill.

Bearing Appliances—Standard appliances for anti-friction bearing mountings are the subject of Bulletin D of the Bearing Appliance Co., Ardmore, Pa.

Tape Machine—Various designs of machines for feeding, measuring and cutting gummed tape are discussed in a recent leaflet of Better Packages, Inc., Shelton, Conn.

Air Conditioning—The application of electrical thermometers to the efficient regulation of air conditioning systems is discussed in a 24-page booklet, Bulletin 4001, issued by Leeds & Northrup Co., 4900 Stenton Ave., Philadelphia, Pa.

Pumping Unit—Leaflet No. 2199 of Allis-Chalmers Mfg. Co., Milwaukee, Wis., describes Type "SSU" pumping unit comprising centrifugal pump and motor mounted on one base.

Metal Foil—For use in protective and distinctive packaging, is discussed in a bulletin entitled "Facts About Packages," issued by Reynold Metals Co., Inc., 19 Rector St., New York, N. Y.

Refrigeration Compressors—Bulletin 1100, a 12-page booklet issued by Carbondale Machine Corp., Harrison, N. J., describes a line of horizontal single and duplex compressors of single stage and two stage type for refrigeration installations.

Chemicals—Rare sugars, amino acids, laboratory reagents and biochemicals are among the products discussed in a recent catalog of Pfanstiehl Chemical Co., Waukegan, Ill.

Cable Accessories—Joints, terminals, oil reservoirs and other cable accessories are described in Catalog GEA-1839, an illustrated publication of General Electric Co., Schenectady, N. Y.

Lubricating Equipment—A revised edition of the general catalog of lubricating equipment made by the Alemite Division, Stuart Warner Corp., 1826 Diversey Parkway, Chicago, Ill., comprising 25 pages of specifications and data, has recently been issued.

PATENTS

Molasses Treated to Remove Organic Acids From Mass Containing Sugars and Inorganic Salts—Eugenio Antonio Vazquez, Habana, Cuba. No. 2,000,202. May 7, 1935.

Oil Expelled From Dried Soy Beans at Relatively Low Temperature Preliminary to Manufacture of Soya Flour—William B. Bishop to A. E. Staley Manufacturing Co., Decatur, Ill. No. 2,000,317. May 7, 1935.

Cereal Coffee Mixture Prepared From Cut Grain Kernels, Granulated Sugar and Salt—Athniel Kloss, Scobey, Mont. No. 2,000,450. May 7, 1935.

Zone Pasteurization of Milk and Other Liquids in Bottles — Arthur Guy Enock, Wembly Park, England. No. 2,000,514. May 7, 1935.

Hygroscopic Carbohydrate Material Mixed with Ground, Oily Nut-like Component to Facilitate Drying of Mixture Producing a Non-Caking Powder—Robert T. Northcutt and Andrew Langstaff Johnston, Jr., to Food Concentrates, Inc., New York, N. Y. No. 2,000,533. May 7, 1935.

Color Developed in Fruit by Treatment in Room Constructed to Give Uniform Circulation of Air and Gases—Hugh B. Hatch, Dunedin, Fla., to Food Machinery Corp., San Jose, Calif. No. 2,000,637. May 7, 1935.

Mayonnaise Made in a Continuously Operating Emulsifying Unit—Thomas M. Rector, Rutherford, N. J., to The Best Foods, Inc., New York, N. Y. Nos. 2,000,645 and 2,000,646. May 7, 1935.

Starch Made From Freshly Ground Potato Pulp, Using Alkaline Sodium Sulphite—Francis H. Thurber, Washington, D. C., dedicated to the free use of the public. No. 2,001,925. May 21, 1935.

Coated Nuts Mechanically Applied to Candy Bars in Pre-arranged Formation—Frank A. Martoccio, Minneapolis, Minn. No. 2,002,018. May 21, 1935.

Corn Chips From Ground Corn Fried in Deep Fat—Charles Elmer Doolin, San Antonio, Tex. No. 2,002,053. May 21, 1935.

Loaf-type Cheese Prepared by Heating With the Addition of Calcium Sulphate up to Approximately 0.75 per cent by Weight—Carl Frehner, Evansville, Wis. No. 2,002,345. May 21, 1935.

Fruit Protected Against Mold Decay by Wax Coatings Containing Chloramine — Jagan N. Sharma, Berkeley, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,002,589. May 28, 1935.

Low Capacity Press For Making Cheese—William D. Williams, Atwood, Ont., Canada. No. 2,002,597. May 28, 1935.

Indirect Fired Bake Oven Designed For Zone Heating—Ralph Byron to J. O. Ross Engineering Corp., New York, N. Y. No. 2,002,976. May 28, 1935.

Fruit Washed With a Solution Containing Hydrochloric Acid and Alkali Metal Salt of Sulphonated Hydrocarbons To Remove Spray Residue—Harry C. McLean and Albert L. Weber, to Endowment Foundation, New Brunswick, N. J. No. 2,003,005. May 28, 1935.

Oil Content of Peanuts Lowered Without Crushing Nuts — Paul Ammann, Paris, France. No. 2,003,415. June 4, 1935.

Means for Arranging, Handling, and Forcing Stick Handles Into Frozen Confections and for Removing Frozen Confections From Molds—Milton Schnaier, New York, N. Y. Nos. 2,003,516; 2,003,517; 2,003,518; and 2,003,519. June 4, 1935.

Frozen Confection Mold Containing Means For Holding Stick in Place During Filling and Freezing Operations—Milton Schnaier to the Popsicle Corp. of the United States, New York, N. Y. No. 2,003,612. June 4, 1935.

Small Capacity Dough Divider For Doughnut Machine—Peter J. Toews to National Automatic Doughnut Machine Co., Minneapolis, Minn. No. 2,003,617. June 4, 1935.

Coated Confections Transferred From Feed Belt to Cooler Belt by an Intermediate Self-cleaning Conveyor—Alonzo Linton Bausman, Springfield, Mass. No. 2,003,851. June 4, 1935.

Sliced Bacon Held in Compact Rigid Package by Central Stiffener and a Wrapper—Harry H. McKee, to Industrial Patents Corporation, Chicago, Ill. No. 2,003,862. June 4, 1935.

Sugar Produced From Mass of Sugar Crystals and Syrup by Addition of Glycol With Subsequent Agitation and Separation—Ignaz Bloch, Dessau, Germany. No. 2,003,965. June 4, 1935.

Chocolate Mass Rotated Rapidly Against Cooling Surfaces to Provide a Fine Fat Grain—William A. Moir, New York, N. Y. No. 2,004,009. June 4, 1935.

Oil Extracted From Citrus Fruit Peel by Applying Pressure to Inner Surface of Peel and Removing Expressed Oil Immediately to Prevent Contact With Peel—Wilbur A. Pipkin, Safety Harbor, Fla. No. 2,004,056. June 4, 1935.

Surface Moisture Removed From Fruit Pieces by Mechanical Means.—Fred S. Colvin, Yakima, and John V. Rogers, Wenatchee, Wash., to Food Machinery Corp., San Jose, Calif. No. 2,004,269. June 11, 1935.

Apple Slices Subjected to a Solution of Sugar, Citric Acid and Salt, Then to Vacuum Prior to Packing and Freezing—James F. Tierney, Upper Darby, Pa. No. 2,004,354. June 11, 1935.

Combined Whipper and Scraper for Ice Cream Freezer—Herbert S. Mills, River Forest, Ill., to Mills Novelty Co., Chicago, Ill.—No. 2,004,446. June 11, 1935.

Cocoa Beans Subjected to Refrigerated Temperatures Prior to Heating to 435 to 570 deg. F. for from 2 to 6 Minutes, Preliminary to Shelling—James J. Bajda, South Orange, N. J. No. 2,004,497. June 11, 1935.

Yolk Color of Eggs in Shell Evaluated by Intensity of Transmitted Light—Raymond R. Haugh to Kraft Egg Machine Co., Chicago, Ill. No. 2,004,943. June 18, 1935.

Combination Doughnut Forming, Depositing and Frying Machine—Charles E. Carpenter, Chicago, Ill. No. 2,005,178. June 18, 1935.

Partially Dehydrated Fruit Kept in Marketable Condition by Treatment With an Emulsion Containing Oil, Water, Sugar, Fruit Pectin and an Emulsifying Agent—Thomas W. W. Forrest to Sun-Maid Raisin Growers of California, Fresno, Calif. No. 2,005,184. June 18, 1935.

BUSINESS TRENDS

Population and Food

FARM population, this year, stands at the highest level ever recorded in the United States. Reversing the trend of the two decades from 1910 to 1920, there have been more people on farms each year since 1930. Figures recently announced by the Bureau of Agricultural Economics show the total reached 32,779,000 on Jan. 1, 1935, compared to 32,509,000 the year before, and 30,169,000 in 1930, the low point.

Should this trend be continued, it will be certain to have considerable effect on the business of food companies. Not only will an increased proportion of farm population in the general population result in the production of more food, but it will also tend to increase the percentage of those who buy little processed food, but rather prepare and preserve their own supplies. This is because the present farm population is more than ample to raise the staple and cash crops, and additional people on farms are likely to be largely subsistence farmers.

Sugar Still Up

WORLD consumption of sugar in 1935 continues at higher levels than in recent years. In fourteen principal European countries, consumption for the first nine months of the current crop year, up to June 1, was 2.7 per cent above the preceding like period. United States sugar consumption for the first six months of 1935, according to Lamborn & Co., was 2,941,307 long tons, raw sugar value, up 3.4 per cent over the same months in 1934.

Along with these increases in consumption go continued increases in U. S. exports of refined sugar. Lamborn & Co. reports exports of 34,785 long tons for the first five months of 1935, an increase of 57.5 per cent over a like period in 1934.

Sugar prices have shown considerable increase, and more is forecast, in view of the larger consumption expected in the months immediately ahead and the tight control under the quota system.

Dairy Output Increases

RELIEF from surplus conditions in the dairy products field was short-lived. As soon as the drought let up, and despite the reduction in the numbers of dairy cattle, supplies began again to exceed effective demand.

By July 1, the U.S. Department of Agriculture reported more than 96 million pounds of butter in cold storage, 26 million more than last year, and 5 million over the five-year average. Cheese and cream in storage, at the same time, had reached normal quantities. Total milk production was up about 4 per cent from 1934 figures, with yield per cow 8 per cent higher.

In the face of this situation, and in spite of falling prices for some dairy products, consumption continues to fall. Latest reports of the U.S.D.A. show consumption below 1934 for all products except cheese, which is about the same. All year, stimulated by high butter prices, margarine consumption has increased. With butter prices now off, margarine has not yet shown the decrease that might have been expected.

Confectionery Sales Up

CONTINUING the trend established in 1934, confectionery and competing chocolate products sales in the first five months of 1935 were 7.8 per cent above the sales for the same period last year, according to the U. S. Department of Commerce.

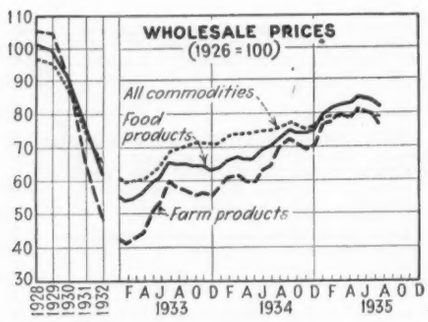
Sales in May, the last complete month so far reported, were 16.3 per cent greater than for May, 1934. Competitive chocolate products again made the best gain, 41.8 per cent. Sales by manufacturers of confectionery were up 14.9 per cent, while, in contrast, sales by manufacturer-retailers declined 5.2 per cent.

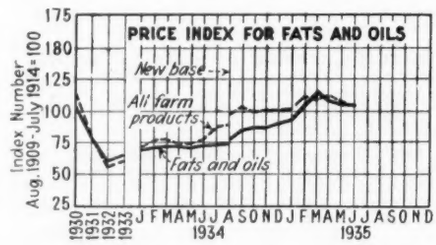
This last figure further confirms a trend recently indicated in a comparison of confectionery distribution in 1933 and 1934, by the Department of Commerce, which showed that 83 of the larger candy companies made 75 per cent of the total sales, and 38 of these accounted for over 60 per cent.

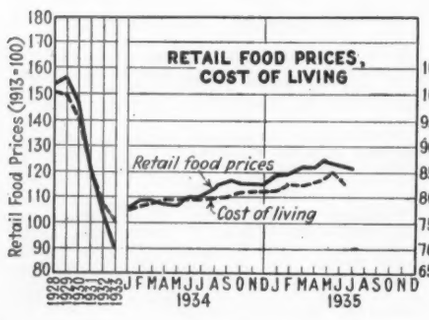
Meat Scarce and High

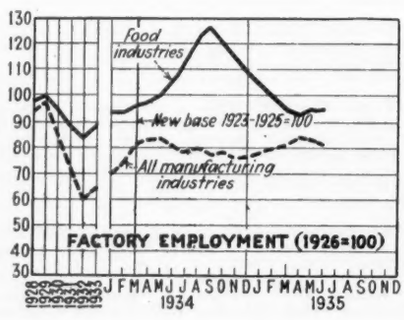
SLAUGHTER of cattle, hogs and sheep under federal inspection for the first six months of 1935 was 26,549,982, compared to the five-year average of 39,514,439. Naturally, with supplies at such low levels prices are high, and would be higher except for consumer resistance. Hogs sold in mid-July at the highest since July, 1930, and, though cattle are off somewhat from the high point of the year, the price is still high. The increases of hog prices at this season is considered by many to be an event of significance.

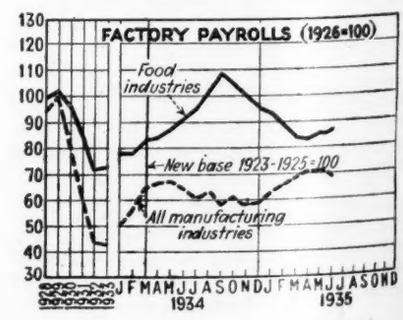
Short supplies have caused the holdings of meat in cold storage to diminish rapidly during recent months, and the total was, on July 1, 42 per cent below the Jan. 1 figure and far below the average. If lard and "relief meat" are excluded, the present quantity in stor-




PRICE INDEX FOR FATS AND OILS
Index Number Aug. 1909-July 1914 = 100
New base
All farm products
Fats and oils
1930 1931 1932 1933
J F M A M J J A S O N D J F M A M J J A S O N D
1934
1935


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913 = 100)
Cost of Living (1923 = 100)
Retail food prices
Cost of living
1928 1929 1930 1931 1932 1933
J F M A M J J A S O N D J F M A M J J A S O N D
1934
1935


Food industries
New base 1923-1925 = 100
All manufacturing industries
FACTORY EMPLOYMENT (1926 = 100)
1928 1929 1930 1931 1932 1933
J F M A M J J A S O N D J F M A M J J A S O N D
1934
1935


FACTORY PAYROLLS (1926 = 100)
Food industries
New base 1923-1925 = 100
All manufacturing industries
1928 1929 1930 1931 1932 1933
J F M A M J J A S O N D J F M A M J J A S O N D
1934
1935

age is the lowest for the date in the twenty years in which records have been kept.

Wheat Price Increases

OPTIMISTIC forecasts for the spring wheat yield, issued early in July, were discounted as the month progressed by increasing reports of rust damage. Prior to this, in June, expectations for winter wheat had lessened to some extent.

Wheat prices had fallen, from mid-April through May and June, and into July. Changes in domestic crop prospects, combined with rust damage in Canada, drought in the Argentine, and diminished prospects elsewhere, caused a reversal of this trend in July. By the third week of the month, the per-bushel figure was about 8 cents over that of the same period in 1934, and a further rise was expected.

Apparently the July 1 forecast of wheat yield, amounting to 731,000,000 bushels, will not be realized. The carry-over, due to last year's drought shortage, is also low. However, the margin is still amply sufficient to assure a wheat supply that will fully meet all domestic requirements, with a probable small surplus to fill export demands, if any exist.

Fish Still Plentiful

CATCHES of fish are still running at high levels, with the most recent figures from New England ports showing landings of 22 per cent above the same period of 1934. Production of frozen fish also remains at high levels, the Bureau of Fisheries' report for the 30 days ending June 15 showing 21,010,000 lb. frozen, against 18,241,000 lb. for the same month of 1934.

In contrast, cold storage holdings of fishery products are tending to fall off. The same report shows total holdings on June 15 only 4 per cent above last year and 1 per cent over the five-year average.

Construction News

	Pending (thousands)	Awarded July (thousands)	Total Awarded 1935 (thousands)
Bakery	$50	$50	$285
Beverages	557	626	3,152
Canning and Preserving	.....	125	768
Confectionery	.....	.....	28
Grain Mill Products	2,726	299	1,016
Ice Manufactured	66	75	359
Meats and Meat Products	196	143	1,831
Milk Products	241	150	1,194
Miscellaneous	1,509	1,284	2,827
Total	$5,345	$2,752	$11,460

INDICATORS

FOOD SUPPLY, this year, will exceed average domestic consumption of recent years, according to the Bureau of Agricultural Economics. Meat and milk will be low, but other foods will be above recent yields.

COFFEE STOCKS are still low, the New York figure of 63,116 bags of Brazils in June being low for the year, although other coffees are in relatively much greater supply.

COFFEE CONSUMPTION continues to decrease, with the world take for the eleven months since July 1, 1934, off 8.2 per cent, reports the New York Coffee and Sugar Exchange.

BEET SUGAR distribution declined 18.8 per cent in the United States during the first six months of the current year, according to the United States Beet Sugar Association.

WISCONSIN sweet variety peas have suffered some drawback, perhaps from other causes in addition to aphis infestation, and are now yielding about 34 to 35 cases per acre against an expectation of about twice that figure.

CANNING CROPS in New York escaped most of the damage from flood water, while wheat, oats, rye and hay suffered severely.

SALMON PACK statistics issued by the Bureau of Fisheries this year show the yield so far to be about one-third of last year's and less than one-half of the 1933 pack reported at the same period.

FREIGHT CARLOADINGS in the third quarter of 1935 are expected to run about 3 per cent over the actual loadings for the same quarter of last year, according to the Association of American Railroads.

CROPS are late, especially in the Corn Belt, where last year everything was brown and dry, and where this year water stood in the fields through much of June and slowed up planting.

CORN GRIND in June was 11.84 per cent below May and 40.22 per cent below June, 1934.

Business Resists Declines

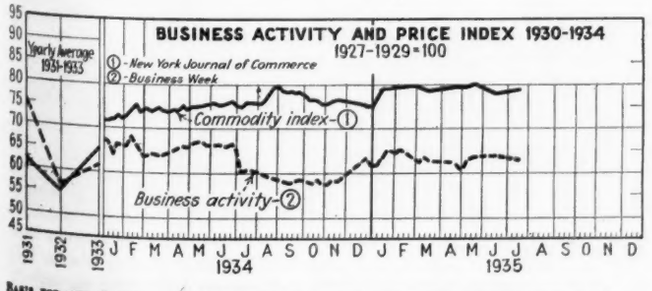
WITH general business conditions approximately 4.7 per cent improved over those of a year ago, as evidenced by the *Business Week* index of business activity, and with a noticeable brightening of the skies for capital goods industries, there is a growing hopefulness and feeling of confidence in an early and continued upturn in general business following the seasonal summer quietness.

Adverse court decisions on the AAA test cases have caused considerable confusion in the consumer goods industries, especially those in which the processing tax plays an important part. Adverse crop conditions throughout the spring wheat, pea-canning, and the corn-growing areas have resulted in higher prices for such agricultural products. Flood conditions have curtailed fresh market supplies and slightly affected canning crops.

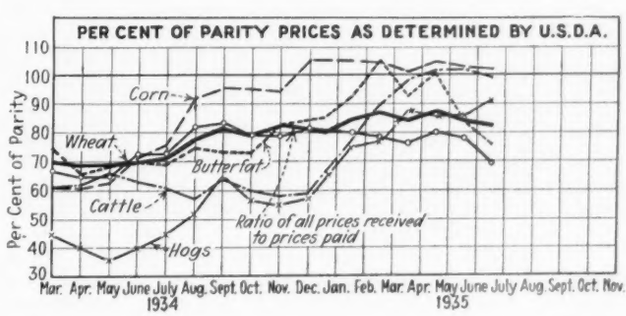
During the month ending July 20 the *Business Week* index of business conditions has fluctuated around 64 per cent of the normal-level, but shows a net rise of 0.15 per cent. July 20 level was 64.4 per cent of normal.

Although the U.S. Department of Labor reports a 0.88 per cent decline in wholesale prices for all commodities, a 3.38 per cent slump for farm products, and a 1.68 per cent decrease for food during five weeks ending July 20, the New York *Journal of Commerce* reports material advances in its weighted price indexes for these same groupings for the month ending July 20. General index is up 1.94 per cent; grain 5.9 and food 5.39 per cent respectively.

Consumer reaction against price increases has been particularly noticeable in the case of meats. Other foods showing marked price increases will likely suffer the same fate. Competing and cheaper foods are resorted to by the food buyers.



BASIS FOR THE CURVES: Retail food prices, factory employment, factory payrolls and wholesale prices based on indexes of the Department of Labor. Cost of living index is that of the National Industrial Conference Board. Indexes of prices of fats and oils, and of all farm prices are from the U. S. Department of Agriculture, as are the per cent of parity prices.


PER CENT OF PARITY PRICES AS DETERMINED BY U.S.D.A.
Per Cent of Parity
Corn
Wheat
Butterfat
Cattle
Hogs
Ratio of all prices received to prices paid
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.
1934
1935

Books Received

CHEMISTRY AND TECHNOLOGY OF WINES AND LIQUORS. By Karl M. Herstein and Thomas C. Gregory. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y. 1935. 360 pp.; 6¼x9¼ in.; cloth; illustrated. Price $5.50.

American as well as European practice of manufacturing, testing, and judging alcoholic liquors, wines, and cordials are included. Production operations from selection of raw materials to final aging and blending of the finished product are fully explained even to the oldest methods still in use, also those found in the newest and largest plants of today.

Explanations are complete and in simple chemical and mechanical terminology. Liquor formulas, definitions and standards and industry statistics are included.

STARCH AND FLOUR QUALITY. By Carl L. Alsberg. Published by Stanford University, Calif. 1935. 26 pp.; 8½x11 in.; paper. Price, $0.50.

Annually the Food Research Institute publishes ten studies on wheat and chooses the subjects so that each complete volume of these studies includes a comprehensive review of the world wheat situation, three surveys and outlooks, and six special studies. In this No. 6 of Vol. XI of these studies is reported existing information dealing with the influence of starch upon the baking value of various flours. Some of the problems awaiting solution are stated and gaps in existing information are designated.

Absorption of water by the starches, susceptibility of starch to diastatic activity and changes that take place in starch which influence the staling of bread are among the factors of starch and flour quality discussed in this study.

FOOD PRODUCTS DIRECTORY OF THE PACIFIC COAST AND ROCKY MOUNTAIN STATES FOR 1934 AND 1935. Published by W. J. McCammon, 1202 Hearst Bldg., San Francisco, Calif. 1935. 336 pp.; 6¼x9⅜ in.; cloth. Price $6.50.

Substituting a section on U. S. Bonded Wineries, Brands of Wines, Owners of Private Brands for Wine, Breweries, Brands of Beer, and Owners of Private Brands for Beer for the section formerly devoted to fresh fruits, Vol. VII of this biennial directory is of increased value to those seeking information on western canners, packers, manufacturers and processors of foods. Dry foods such as nuts, beans and dried fruits are also included. The listings are by name and company; giving address, officers, location of plants, products, brands, and style of pack; by product, by location and by brand.

Also supplied is a classified list of firms furnishing equipment, supplies and services to food manufacturers, processors, and packers in the Pacific Coast and Rocky Mountain regions.

BEHIND THE SCENES OF BUSINESS. By Roy A. Foulke. Published by Dun & Bradstreet, Inc., 290 Broadway, New York, N. Y. 1935. 150 pp.; 7x10 in.; paper. Free.

As manager of the Analytical Report Department of his company, the author has access to a wealth of information which is of high value to the management of any company. For this brochure he has drawn on data collected over a period of three years and worked out balance sheet and operating ratios from 49 lines of business including confectionery manufacturers, fruit and vegetable canners, and butter, eggs, cheese, grocery, and fresh fruit and vegetable wholesalers.

In Part I are discussed the prosperity factors of a business enterprise; Part II consists of a review of the industries based on important capital, inventory, sales, and net profit ratios; and Part III is a study of the wholesale grocery trade. A composite table of all ratios and an index comprise a 16-page appendix.

ANNUAL REVIEW OF BIOCHEMISTRY, VOL. III. Edited by James Murray Luck, Stanford University. Published by Stanford University Press, Stanford University, Calif. 1934. 558 pp.; 6½x9 in.; cloth; illustrated. Price $5.

Of the 26 subjects covered in this monumental review of technical scientific literature those chapters on Water in its Biochemical Relationships, by R. A. Gortner, Enzymes by E. Waldschmidt-Leitz, Vitamins by L. J. Harris, and the Chemistry of Bacteria by M. Stephenson are of most general interest to food production technologists.

Sponsored by Francis Garvan and the Chemical Foundation aided by additional funds from Dr. Richard J. Block these reviews present a critical survey of literature on chosen subjects. They cover current developments in 25 to 30 major fields of interest and are as comprehensive as available space permits. Selected aspects of the particular subject under review are dwelt upon with discussions on the most significant contributions. Object of these reviews is to shorten the task of referring to original papers by research workers and others interested in the subjects under review.

HENLEY'S TWENTIETH CENTURY BOOK OF FORMULAS, PROCESSES AND TRADE SECRETS. Edited by Gardner D. Hiscox. Published by Norman W. Henley Publishing Co., 2 West 45th St., New York, N. Y. 1935. 809 pp.; 6x9 in.; cloth. Price, $4.

Why any formula or recipe published in such a widely used book should be designated as a "trade secret" we are at a loss to explain. Yet some of the contents of this compilation, first edition published in 1907, are so classified by its publishers for the benefit of the experimenter in the laboratory, workshop, factory and home. Revised and enlarged by Prof. T. O'Conor Sloane to include what is new, to discard what is obsolete, to include a glossary of chemicals and their common names, and to give general information on materials to be used, the contents of this book, as of all other formulary or recipe books, should be regarded only as suggested beginnings for the working out of a formula or a satisfactory product to meet a need. Even in the hands of the technically trained experimenter or research worker the best formula known will not give the desired results unless the correct conditions and methods of compounding and processing are observed.

To indicate which of the alleged 10,000 formulas and the like that might be of value to the technologist or handy man about a food plant would be like pointing out the needle in the proverbial hay stack. There are sections devoted to adhesives, anti-freezes, beverages, candy making, cheese, chewing gum, cleaners and detergents, essences and extracts, insecticides, milk and refrigerants which have direct interest to many in the food manufacturing business.

INDEX TO THE LITERATURE OF FOOD INVESTIGATION. By Department of Scientific and Industrial Research, Food Investigation Board, London, England. Published by His Majesty's Stationery Office, Adastral House, Kingsway, London, W.C.2. 1935. 309 pp.; 6¼x9⅝ in.; paper. Price, 5 shillings net. Obtainable from British Library of Information, 270 Madison Ave., New York, N. Y.

Not only does this report include literature references and abstracts from more than a hundred world-wide selected publications but also a 15-page review of developments in food study and investigation during 1932-33. Subjects discussed are Gas Storage of Animal Products, Rancidity, Marine-Animal Oils, Milk and Milk Products, Eggs, Freezing of Animal and Vegetable Tissues, Fruit Juices, and Storage and Transportation of Fruit.

MAJOR TRENDS IN AMERICAN ECONOMICS FROM 1492 TO 1950. By L. J. Jensen. Published by George E. Liggett and Associates, 112 West Ninth St., Kansas City, Mo. 1935. 20 pp.; 7x8½ in.; paper. Price $1.

Among the many speculations and theories as to the whys and wherefores of business cycles the author of this booklet advances the science of astro-economics. He concludes that a variation in the solar energy constant, 1.92 to 1.96 calories, affects the human race biologically and psychologically as indicated by the rise and fall of business activity statistics. In addition to the sun-spot effect he includes the effect of planetary cycles and planetary interaction. On the basis of study and analysis of past business cycles and the planetary relationship he forecasts a prosperous business peak in 1938 and another low in 1943 and 1944. However skeptical we may be of such reasoning this booklet is interesting reading and presents some surprising relationships.

Keeping Up With the Field

- ***Courts smother AAA with process-tax injunctions***
- ***Senate passes AAA amendments after long wrangle***
- ***Food distributors tangle over Patman legislation***
- ***House acts on food bill; drug men oppose passage***
- ***Food manufacturers still stick by NRA principles***

Passes AAA Amendments

After wrangling for days over what should be deleted and what should be added, the Senate on July 23 passed the bill amending the AAA. As put through by the Senate, the bill varies greatly from the form in which it passed the House, and the differences will have to be ironed out in conference.

Intended to render the AAA more flexible and to protect it against court attacks, the bill does not bar suits for the recovery of processing taxes, but it does require the presentation of processors' books, records and papers in such suits. In respect to marketing agreements and licenses, it provides that the word "license" of the present law be changed to "order," an order applying only to a commodity in interstate commerce or directly affecting interstate commerce. Foods subject to the Secretary's orders include milk, fruits (not including apples or fruits for canning), vegetables (not for canning, except olives, and not including beans) and soybeans. An order of the Secretary becomes effective with a marketing agreement when signed by not less than 50 per cent of the handlers of a commodity. Violation of an order involves fines of $50 to $500.

Processing tax rates in effect at the time the bill becomes law are enacted to Dec. 31, 1937. Then, when a commodity averages 90 per cent of the parity price during the year, and not in excess of 20 per cent above parity, the tax for the succeeding year is to be 20 per cent of parity; if the price be 20 per cent above parity, the tax is to drop to 10 per cent.

The bill authorizes the President to restrict imports to protect domestic production, makes potatoes a basic commodity with a sales tax of 45 cents a bushel when the grower exceeds his quota and puts processing taxes of 30 and 25 cents, respectively, on rye and barley.

The Senate also passed the "ever normal" granary plan, authorized expenditure of $50,000,000 for submarginal land and approved a fund of $40,000,000 to fight tuberculosis in cattle.

If the Senate's version of the amendments becomes law, processors now seeking relief from processing taxes through the courts will be blocked. The bill validates taxes in effect when it is enacted.

Where Food Bill Stands

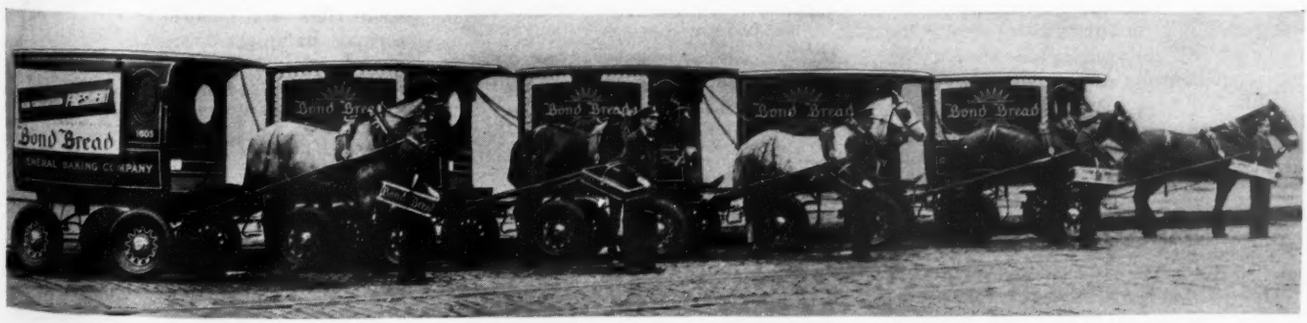
Although it passed the Senate as long ago as May 28, the Copeland Bill still was being held up in the House when Food Industries went to press. The bill has the approval of the food industries, with certain changes, but is strongly opposed by certain drug interests. Associated Grocery Manufacturers of America recently recommended enactment of the legislation with amendments providing that ingredients be listed with the Secretary of Agriculture instead of on labels, and that when a sample is taken for a purity test the manufacturer also be given a sample for testing.

Beginning on July 22, a hearing was held on the bill by the House Interstate and Foreign Commerce Committee. At this hearing, Institute of Medicine Manufacturers expressed favor for continuation of the present Food and Drug Act rather than the enactment of a new law.

President Roosevelt has thrown Administration support behind the Copeland Bill, and prospects are that it will pass. A food and drug bill introduced by Representative Sirovich is said to have no chance.

AAA Hits Skids

The AAA, it appears, may take a place alongside its late lamented brother, NRA, in the burial ground of the courts. Within the past few weeks, suits against processing taxes have piled up to the grand total of 392, as of July 22. Injunctions against collection of the processing levies have been handed out in courts all over the country, and the taxes have been declared unconstitu-



DELIVERS BREAD ON AIR

Pneumatic-tired delivery wagons, recently adopted by a number of dairies, have been put to use in the baking field. General Baking Co. has equipped twelve of its delivery wagons in Philadelphia with pneumatic tires on wheels of the automobile type. In addition to effecting economy through reduced wagon maintenance and less fatigue for both horses and drivers, General Baking Co. expects the pneumatic tires to put the bread in the consumers' hands in better condition.

tional in the Federal Circuit Court of Appeals at Boston. Meanwhile, AAA intends to continue on its way until it sees what the Supreme Court has to say about the Boston decision this winter.

The suit in the Boston court was instigated by Hoosac Mills Corp., and the others involve a large number of flour milling and meat packing houses. Outstanding among food company victories over the AAA is the injunction granted by a federal district court in Minneapolis restraining the collection of processing taxes from sixteen large milling companies, five of which were subsidiaries of General Mills, Inc. Among the larger meat packers to win an injunction against the tax on hogs is Kingan & Co., which, with seven other Indiana meat packing and milling companies, was awarded a temporary injunction in a federal district court.

The Patman Fight

THE OLD fight between the chains and the independents has been renewed, with the wholesalers and brokers backing up the independents and the food manufacturers taking a middle position. All this is the result of the Patman Bill (H.R. 8442 and S. 3154), which would prevent price differentials and brokerage allowances, and suppress "pseudo-advertising" allowances.

The fight came to a climax in the Patman probe into "super lobbying" by chain stores, at which time A. & P. divulged its advertising allowances and brokerage earnings.

The attitude of food manufacturers in regard to this legislation has been expressed by Paul S. Willis, president of Associated Grocery Manufacturers of America. The A.G.M.A. endorses the purpose of the bill to regulate price discrimination and, in particular, for the prohibition of compensatory payments. The association, however, opposes the bill as drawn, setting forth objections in a brief filed with the House Judiciary Committee.

A.G.M.A. believes "cooperative" advertising should be on the basis of separate contract, that no manufacturer should pay brokerage commission to a trade buyer or make a quantity price unless based upon a saving, and that a retailer should not sell below invoice or replacement price (whichever is lower).

This bill will likely carry over until the next session of Congress.

Concentrates Vitamin G

VITAMIN G can now be recovered from the whey residue of milk, the first time the vitamin has been available in concentrated form. This is the result of a new, inexpensive method of recovery developed in the laboratories of Dry Milk Co., a Borden subsidiary.

A significant feature of the twelve years of research work leading to this development, according to Dr. G. C. Supplee, was the discovery that Vitamin G consists of two components, one being identified as lactoflavine, the other having as yet no designation. Lactoflavine is the growth-promoting element and the associated component is considered the anti-pelagric factor. The former is present in whey in the proportion of three to five parts per million, Dr. Supplee announces.

To determine the presence of Vitamin G quickly, "black light," or invisible ultra-violet, is employed. Lactoflavine shows a brilliant yellow fluorescence when exposed to these rays.

DR. C. A. BROWNE

He retired July 1 as assistant chief of the Bureau of Chemistry and Soils to devote his time to research, Dr. W. W. Skinner taking over his administrative post. Dr. Browne is now in Australia to present two papers at the convention of International Society of Sugar Technologists. Shortly after his return he is expected to publish a new "Handbook of Sugar Analysis."

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Conventions

AUGUST

12-14—Bakers' Association of the Carolinas, Ocean Forest Hotel, Myrtle Beach, S. C. E. B. Graeber, 1013 Commercial Bank Bldg., Charlotte, N. C.

15-18—National Food Distributors Association, annual meeting, Hotel Statler, Detroit. E. J. Martin, 110 N. Franklin St., Chicago, secretary.

19-23—American Chemical Society, semi-annual meeting, San Francisco. Charles L. Parsons, 728 Mills Bldg., Washington, D. C., secretary.

27-Sept. 3—International Society of Sugar Technologists, Brisbane, Australia.

SEPTEMBER

9-11—American Fisheries Society, Tulsa, Okla. Seth Gorden, Investment Bldg., Washington, D. C., secretary.

25-27—Association of Ice Cream Manufacturers of Pennsylvania and New Jersey, Berkeley-Carteret Hotel, Asbury Park, N. J.

A. & P. Gets Ads Free

FOOD manufacturers in 1934 gave the Great Atlantic & Pacific Tea Co. more than enough in advertising allowances and brokerage discounts to meet its annual bill for printed advertising. Advertising allowances totaled $6,105,000; brokerage discounts, $2,000,000. A. & P. spent for printed advertising approximately $6,000,000. These figures are from the testimony of Charles W. Parr, assistant to the chief purchasing agent of the chain, at the investigation of the American Retail Federation and chain stores by the Patman committee.

About 350 manufacturers last year gave A. & P. allowances or discounts. The following are the concessions by a few outstanding companies:

Armour & Co., 3 to 7 per cent canned meats advertising allowance and ½ per cent allowance on fresh meats if purchases total $1,000,000; California Packing Corp., 5 per cent pur. contract; General Foods Corp., $30,000 flat advertising allowance a month, or 5 per cent discount for advertising; Kraft-Phenix Cheese Corp., 2 to 3½ per cent for $100,000 to $800,000 and an additional 1½ per cent for quantity; National Biscuit Co., 7½ per cent by N. B. C. branch direct, and 1 per cent to 4½ per cent by N. B. C. headquarters, according to the quantity reached.

All this information on the A. & P. allowances, according to Paul S. Willis, president of Associated Grocery Manufacturers of America, is meaningless in the absence of comparative figures covering transactions between manufacturers and other customers.

What's Wrong With Wine

"WINES probably will not win widespread acceptance in the United States until existing confusion over their identity is cleared," says Jean Legrand, proprietor of F. Chauvenet and great great grandson of the creator of sparkling burgundy. "Except for a handful of very well-known brands, labels are practically meaningless here," he stated. "Furthermore," he said, "Americans have gained a false impression as to the proper use of wine. It is believed here that only certain vintages are acceptable to accompany each course of the meal and these must be selected with mystic finesse. Abroad, such rites are observed only at most formal banquet occasions." M. Legrand, who lives in Nuits, France, recently visited the United States.

Dairy Probe Blocked

AMBITIONS of the Federal Trade Commission to dig up dirt in the dairy industry suffered a set-back last month. The Senate Appropriations Committee refused to include a provision for the $200,000 needed for the continuance of the FTC's investigation in the second deficiency appropriations bill. The Administration, including the President, already had approved the fund. Investigations made by the FTC in Philadel-

phia and Connecticut resulted in its charging the dairy industry in those localities with high-handed practices.

Loft on Carpet

CHARGES of unfair competition have been hurled at Loft, Inc., Long Island City, N. Y., by the Federal Trade Commission. After investigating the company's advertising "messages," the FTC accused the concern of making untrue statements about its own products in regard to the absence of glucose and of issuing statements about glucose which were detrimental to other candy manufacturers. The company is said to have given the impression that glucose is harmful to health and is a cheap substitute for sugar. Loft must answer the charges on Aug. 16 or receive a cease and desist order.

To Adjust Rye Crop

IN THE FACE of concerted action on the part of industry to break down the agricultural control program, Secretary Wallace on July 2 signed a proclamation establishing an AAA adjustment program for this year's rye crop. Prospective rye production, according to the AAA, reaches 44,000,000 bu., as compared to 16,000,000 bu. last year and a five-year average (1929-33) of 35,167,000 bu. Rye prices dropped from an average of 71 cents a bushel last year to 53.7 cents on June 15.

New Food Divisions

Two new divisions, vitamin and pharmacological, have been created in the Food and Drug Administration. The vitamin division, with Dr. E. M. Nelson in charge, will check claims and help establish standards for foods and drugs of vitamin potency. The pharmacological division, of which Dr. Erwin E. Nelson is chief, will, among other things, investigate the effects of poisons and impurities present in foods and study the effects of synthetic chemicals in foods and medicines. The problem of spray residues on fruits and vegetables will be taken up immediately.

Two Coffee Decisions

TWO MOVES looking toward better trade relations and a bigger volume of business were made at the convention of Associated Coffee Industries of America, held in Chicago recently. One was the adoption of fair trade principles; the other, a decision to spend more than $1,000,000 annually in a national advertising campaign to continue five years.

The fair trade principles, observance of which will be largely voluntary, prohibit false or unethical advertising, adulteration and misbranding, commercial bribery, false invoicing, excessive samples, advertising allowances, free equipment, cash discounts, unfair substitution and destructive price cutting. The association also decided to abide by the NRA labor standards, and the executive committee recommended that the filing of open lists of prices and the publication of replacement valuations be continued.

Carl Whiteman, vice-president of General Foods Corp., recently was made a director of the coffee association.

Industry Goes Ahead

THERE has been no change in the operating schedules of food and grocery manufacturers since the NRA was terminated, according to Paul S. Willis, president of Associated Grocery Manufacturers of America. In a report on a recent meeting at which 36 of the food industries were represented, Mr. Willis states that all the industries expect to maintain good standards of hours and wages and to observe fair trade practices. In the matter of hours and wages, it was the concensus that it is the industry's obligation to maintain high standards voluntarily, otherwise the Administration might legislate severe restrictions. The manufacturers also expressed disfavor for codes, it being their desire to work out problems through trade associations.

Sugar Kills Bacteria

SUGAR can be made to prevent the growth of bacteria if it is irradiated with ultra-violet rays of 2,573 Angstrom units for an hour, according to Dr. I. H. Blank, of Harvard University. Twenty-two different kinds of sugar are said to acquire the lethal power under ultra-violet irradiation, these including cornstarch, maltose, dextrine, glucose and lactrose. Glycogen was not affected in this way.

Dr. Blank discovered this property of sugar in experiments to determine why food combinations in which bacteria grow freely fail to produce germs if exposed to ultra-violet rays before the germs are planted. The organisms inhibited from growth by the irradiated sugar were colon bacteria, yeasts and molds.

CARL WHITEMAN
Becomes a director of A.C.I.A.

N.C.A. Branches Out

THAT its activities may be made more effective throughout the country, National Confectioners' Association has divided the map into six areas, in which local organizations will be set up. The areas include the Northeast, the South and Gulf areas, the Central West, the Mid-West, the Southwest and the West Coast.

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Concentrates

THE PROCESSING tax on wheat remains at 30 cents a bushel, benefit payments being 33 cents . . . Bids have been requested on 5,000,000 lb. of butter and 2,000,000 lb. of cheese for the Federal Surplus Relief Corp. . . . AAA expenditures from July 1, 1934, to June 1, 1935, totaled $767,195,306, from available funds of $918,045,135; from June 1, 1934, to April 30, 1935, $493,007,693 was collected in processing taxes.

UNITED STATES BREWERS' ASSOCIATION has asked a reduction in the tax on imported brewers' rice on the ground that it is prohibitive and the domestic supply is below demand . . . The Guffey-Dockweiler Bill to exempt Philippine coconut oil for industrial use from the 3-cent excise tax is not expected to pass this session of Congress . . . On Aug. 5, the reciprocal trade agreement with Sweden becomes effective.

LIVESTOCK interests are fighting a proposed sanitary convention with Argentina which would permit animal and plant products to be imported from that country . . . A new variety of tomato, the Glovel, is said by the Department of Agriculture to be free of growth cracks, to yield highly, to mature "second early," and to be highly resistant to Fusarium wilt and nailhead rust . . . Spinach grown on upland soil averages 50 per cent higher in vitamin C than that from muck soil, according to a paper to be presented before American Chemical Society.

SELENIUM in food plants may be detected by the heat-ray spectroscopy, Prof. G. R. Harrison, Massachusetts Institute of Technology, reports . . . Sheet steel can be coated with aluminum by a process developed by Prof. Colin G. Fink, Columbia University, and an air-tight seal has been perfected for cans of this material without soldering, it is reported.

Men . . . Jobs . . . and Companies

Industry

• ARMOUR & Co. has purchased the business and equipment of Memphis (Tenn.) Packing Corp. for about $1,000,000, taking possession Aug. 1. The company plans no immediate expansion of this plant. Armour also is making improvements in its Indianapolis branch, at a cost of $28,000.

• BORDEN MILK PRODUCTS Co. has purchased the milk plant of Schneider & Son, Portland, Mich.

• BLUE VALLEY CREAMERY Co. is opening at Cedar Rapids, Iowa, a new cheese factory with a milk capacity of 10,000 lb.

• BUFFALO FLOUR MILLS Co., a unit of Commander Larabee Flour Mills Co., is enlarging its mill and will make it one of the most modern in New York State.

• CRYSTAL PURE CANDY Co., Chicago, will construct a $35,000 addition to its plant, this being the second addition since the company was founded 15 years ago.

• CUDAHY PACKING Co., Chicago, plans a new bond issue of $30,000,000, with interest at the rate of 3¾ per cent. The company also seeks authority to issue $5,000,000 of 4 per cent debentures.

• DAYTON (Ohio) DAIRY PRODUCTS Co. announces a three-phase construction and improvement program involving the expenditure of about $100,000. The program includes a new building, new equipment and a new fleet of trucks.

• FEDERAL MILL, INC., Lockport, N. Y., has purchased the trademarks, goodwill and brands of Moseley and Motley Milling Co., Rochester.

• W. A. GABEL DAIRY, INC., Detroit, will construct a new plant with a capacity of 5,000 lb. per hour.

• H. J. HEINZ Co., Pittsburgh, is building a three-story addition to its canning plant at Saginaw, Mich.

• HOVDEN FOOD PRODUCTS CORP. opened last month a new $85,000 fish cannery at Watsonville, Calif. The plant will handle 200 tons of fish daily.

• HUTCHINSON ICE CREAM Co. has let contracts for a $75,000 addition to its Mason City, Iowa, plant. This will raise the capacity of the plant to almost 1,000,000 gal. a year.

• KRAFT-PHENIX CHEESE CORP. has under construction a $150,000 addition to its factory in Freeport, Ill., and it will add a cold storage plant later.

• MASON, AU & MAGENHEIMER CONFECTIONERY MANUFACTURING Co., Brooklyn, N. Y., has petitioned for reorganization under Section 77B of the National Bankruptcy Act. The concern is solvent but lacks sufficient liquid assets, according to an executive.

• MINNESOTA VALLEY CANNING Co., Le Sueur, Minn., will pack corn on the cob exclusively in one of its plants this year. No. 2 tall cans, with ribs along the length to strengthen them against the vacuum, will be used.

• NEW ENGLAND BAKING Co. will establish a new manufacturing and distributing center in Elmwood, Conn.

• OXNARD CITRUS ASSOCIATION has let the contract for the erection of a $200,000 lemon packing plant to have a capacity of 800 cars.

• PHILLIPS PACKING Co., Cambridge, Md., has formed a new subsidiary, Phillips Transport Co., to operate its freighting vessels and motorized equipment.

ARNOLD OPLER

Formerly in charge of sales for E. & A. Opler, Inc., Chicago, he has been elected president of the corporation, effective July 1.

• SHEFFIELD FARMS Co. has introduced in New York City vitamin D grade A fluid milk. Each quart is reported to contain 400 U.S.P. vitamin D units. A vitamin D concentrate is added to the milk.

• SWIFT & Co. has acquired a building in Colfax, Iowa, which it will convert into an ice cream plant.

Personnel

• VICTOR A. BONOMO has been elected president of Bonomo Candy & Nut Corp., Brooklyn, N. Y. JOSEPH BONOMO was made secretary and treasurer; CHARLES MCLEOD, superintendent of the general plant. HERBERT E. COLLUMBELL quit as vice-president and general manager.

• M. A. BRIGGS, Durham, N. C., becomes president of Piedmont Millers' Association.

• MARY MINTON BROOKE has joined Puritan Mills, Inc., Chicago. She is in charge of the bacteriology and chemistry of Vita-Plus cultures and Supershort, and will direct the service and demonstrating department.

• JAMES F. BROWNLEE recently left General Foods Corp., of which he was a vice-president and director, to become president and director of Frankfort Distilleries, Inc., Louisville.

• DAVID K. E. BRUCE, son-in-law of Andrew W. Mellon, has sold his entire stock interest in National Grain Yeast Corp., Belleville, N. J., the organization of which JAMES ROOSEVELT recently became president.

• W. A. BUNDY, California canner, and FRANK E. RAITER, head of San Xavia Fish Canning Co., have taken over the Stockton plant of Oakland Packing Corp., operating it as Stockton Food Products, Inc.

• WILLIAM T. CAMPBELL, formerly director of research for Coca Cola Sales Co., Atlanta, has purchased, together with CRAWFORD JOHNSON, Birmingham, the Coca Cola Bottling Co. at Des Moines.

• A. E. CRAIG recently was made president and general manager of Dayton (Ohio) Bread Co., being formerly vice-president and general manager.

• C. J. HOWEL, who five years ago sold his business to Orange-Crush Co., is

back in the beverage industry, having organized Wonder Orange Co., Chicago.

• J. H. HEALEY will manage the Southwestern territory of Corn Products Sales Co. He has been district manager in Memphis for nine years.

• AUSTIN S. IGLEHEART, vice-president and director of General Foods Corp., New York, has taken complete charge of sales and merchandising. He succeeds JAMES F. BROWNLEE, resigned.

• DR. STROUD JORDAN, head of Stroud Jordan Laboratories, New York, has been retained by New York City to cooperate with its purchase laboratories and bureau of specifications.

• JOHN MACMAHON recently was chosen chairman of Reid, Murdoch & Co., Chicago, succeeding the late J. J. DAU. Mr. MacMahon was successively elevator boy, secretary, director and vice-president.

• ROBERT P. MEARS resigned July 15 as chemist with Borden Milk Products Co. to go with Walter Baker & Co., Inc., Dorchester, Mass.

• ASHBY MILLER has been elected vice-president of General Mills, Inc., Minneapolis.

• H. O'GRADY is the new superintendent of Cudahy Packing Co.'s plant at Denver.

• WILLIAM H. RAYE has resigned as president of General Seafoods and North Atlantic Oyster Farms, General Foods subsidiaries.

• D. J. ROACH, for the past seven years manager of the Scottsbluff and Gering factories of Great Western Sugar Co., has been appointed manager of the Nebraska district.

• WILLIAM M. ROBBINS, vice-president of Walter Baker & Co., Inc., has been appointed manager of General Food's Eastern plants to succeed UDELL C. YOUNG.

• DR. J. H. SHRADER has been transferred from the research laboratories of National Dairy Products Corp., Inc., in Baltimore, to the executive offices of Sealtest System Laboratories, Inc., New York.

• H. K. SMITH, Wheatley, Ark., again will head the Arkansas Rice Growers' Association.

• J. B. SMITH, Salina, Kansas, recently was re-elected chairman of National Millers' Federation.

• S. D. SQUIRE, for fourteen years with Best Foods, New York, has resigned as manager of the company.

• A. G. STEGMEIER, president of Buffalo Master Bakers' Association, has been elected president of New York State Association of Handcraft Bakers.

UDELL C. YOUNG

He has been promoted to manager of manufacturing and transportation of General Foods Corp., New York. Mr. Young previously was manager of the company's Eastern plants. He takes over the former duties of Austin S. Igleheart, who now heads up the company's sales activities.

• A. TRAWICK becomes executive vice-president of Jersey Farms Milk Service Corp., being formerly vice-president and general sales manager of Tennessee Biscuit Co., Nashville.

• THOMAS E. WILSON has been re-elected chairman of Wilson & Co., Chicago. He has been head of the board since the death of CHARLES D. CAREY.

• L. C. YOUNG now is superintendent of the McGrath Candy Co., Seattle.

Deaths

• JOHN G. AGAR, 41, secretary and treasurer of Agar Packing Co., Chicago.

• WILLIAM E. BLETSCH, 69, president of Alomoco Corp., Chicago syrup concern, and a director of Meeker Sugar Refining Co. of Louisiana, June 29.

• GEORGE A. BORN, 53, senior partner of August Born & Sons, Milwaukee packing firm.

• CHARLES E. BUELL, head of C. E. Buell, Inc., Boston milk products firm.

• JAMES W. BRYDEN, 83, former secretary of the Cudahy Packing Co., Chicago, June 24.

• DR. MARION DORSET, 63, noted for the development of a serum to prevent hog cholera and a harmless fluid for marking federally inspected meat, July 14. He had been a research worker in biological chemistry and chief of the Biochemic Division, Bureau of Animal Industry.

• ELBERTON R. INGRAHAM, 64, for the past 40 years chief engineer of North Truro (Mass.) Cold Storage, Inc., and prominent in the Cape Code fishing industry, July 10.

• BURT KENNEDY, general manager in South America for Swift & Co., at Buenos Aires, July 16.

• GEORGE L. LOFT, 40, son of George W. Loft and vice-president of George W. Loft Markets, Inc., New York, July 4.

• CHRISTOPHER O. MOSER, 50, president of Institute of American Fats and Oils, Washington, July 11.

• ARTHUR C. ROCHE, 51, general manager of Loose-Wiles Biscuit Co., at Boston, from 1910 to 1920, July 18.

• PETER B. SCHUBRING, 66, retired superintendent of the cutting department of Cudahy Packing Co., Chicago.

• NICHOLAS WOLTER, 61, president of Illinois Packing Co., Chicago, June 30.

Associated Industries

• BAGPAK, INC., has appointed International Paper Products Corp., New York, sole selling agent for its line.

• COMBUSTION ENGINEERING CO., INC., has appointed Theodore H. Ross district sales manager, in Pittsburgh, of its industrial stoker division.

• FRICK CO., INC., Waynesboro, Pa., announces appointment of Henning N. Borgstedt as manager of its branch office in New York City.

• GAIR BOSTON CONTAINERS, INC., has acquired the corrugated contained division of Sherman Paper Products Corp.

• THE NEW YORK TIMES has assigned Charles B. Emde, assistant to the advertising director, to food classification in the national advertising department.

• READ MACHINERY CO., INC., has placed C. E. Whitaker in charge of the Providence, R. I., territory.

• RICHARDS-WILCOX MANUFACTURING CO., Aurora, Ill., announces that H. C. Sturman is in general charge of sales in the OveR-Way material handling division.

• STEPHENS-ADAMSON MANUFACTURING CO., Aurora, Ill., has appointed L. R. Veatch to handle sales and engineering of its Redler conveyors in Buffalo.

What to Know About Wells

(Continued from page 385)

had a comparatively short life. As a result, gravel-treated wells became more popular.

A gravel-treated well has large openings in the strainer, but has a layer of gravel around the screen to prevent sand from entering. Wells of this type must be developed by pumping, bailing, surging or otherwise removing all the fine sand surrounding the well. Some types of gravel-treated wells are constructed by putting down a temporary steel casing, then placing a permanent well casing inside, the annular space between the two being filled with gravel which follows the permanent casing down. The only way to insure a positive gravel treatment of a well of this type, however, is to sink the outer casing to the full depth of the well, install the permanent casing, and back pack the annular space with gravel. The reason for this is that the entire "log" of the ground is known and each individual sand stratum can be gravel-treated accordingly. Furthermore, this method of gravel treatment insures a uniform layer of gravel around every square foot of the strainer section. A well of this type, properly constructed, will yield more water per foot of lowering under pumping than any other type of well we have observed. To give the well a long life, the permanent casing must resist corrosion and withstand ground pressures under pumping.

IF THE ground formation is such that the supply must be obtained from rock, one is up against the problem of constructing a deep well of relatively small diameter by drilling. Wells of this type, because of their depth are, of course, costly by comparison. Water from them is more likely to be highly impregnated with minerals, it will be higher in temperature, and the pumping costs per gallon will be much higher. Therefore, unless a deep-rock well is the only chance of securing water, it ordinarily should not be considered.

The height to which the water will stand in a well is known as the static level, or the ground-water table. This will vary from time to time during the year, and also from year to year. It is important to know whether it is raising or lowering, as this affects output and pumping costs. When a well is pumped, this static level lowers not only in the well but in the ground surrounding it. This area of lowering is generally in the form of a circle, called the "circle of influence"; the dip in the water table caused by pumping is the "cone of depression." The diameter of the circle of influence determines the distance apart that wells should be spaced so that they will not interfere with each other. This circle can easily be determined, and management should see to it that wells are properly spaced.

It also is important to know that a well in a sand-gravel formation yields in direct proportion to the length of the strainer, so long as the formation is uniform. However, the amount of lowering, in relation to the output, is not uniform, being approximately as given in the accompanying table. It should be borne in mind, too, that wells do not yield in direct proportion to their diameters. A 20-ft. well will yield not quite two times as much water per foot of lowering as a 2-ft. well. This explains why diameters of gravel-treated wells are usually no larger than 18 to 30 in.

Management should be acquainted with the various types of pumps and insist on the most efficient being used, no matter what the depth of the well. It is not unusual to find suction-pumped wells being abandoned when there is many times the capacity of the pumps remaining below the limits of suction. These wells could still be worked with deep-well pumps, provided their diameter is sufficient to accommodate the bowls of these units.

There are other sources of ground water beside wells, such as horizontal infiltration galleries and springs. The former have not come into general use because they are difficult to construct, are unreliable and are not suitable for many ground situations. The collection of water from springs is simple. There is only one thing to be remembered—there is practically nothing that can be done to increase their flow.

The manner of contracting for well work should by all means be understood by the plant executive. In general, there are two methods of contracting—the "guarantee" and the "non-guarantee." Any reliable water developing company is willing to give guarantees of production, but it is better to have test work done at a certain charge per foot. Then, if the amount of water is sufficient, have the wells constructed on the basis of unit prices per foot.

One should insist on guarantees that the wells will be mechanically sound and plump and that they will neither clog up nor permit fine sand to pass into them under pumping. But the minute one begins to talk of guarantees of production, the price will go up in accordance with demands.

Relation between amount of lowering of a well and the output.

Per Cent of Lowering		Per Cent of Yield
10	Equals	18
20	"	35
30	"	51
40	"	64
50	"	76
60	"	85
70	"	91
80	"	96
90	"	99
100	"	100

Ripening Tomatoes

(Continued from page 376)

fifth of the lot had become badly infected on completion of the test.

Transfer of Odor in Shipping Boxes (Paper Carton). Green tomatoes, 10 per cent of which were artificially inoculated with *B. carotovorus,* were wrapped in (1) moistureproof transparent cellulose and (2) in non-moistureproof transparent cellulose lots and packed in the usual commercial paper cartons used for shipping. The boxes were 14 x 7½ x 6 in., and had six ¾-in. holes for ventilation on each box. They were stored at a constant temperature of 5 deg. C.

After five weeks there was no difference in the color of the two lots. Each was a light green. The infected tomatoes in the non-moistureproof transparent wrappers were the more badly decomposed. Due to the green condition of the fruit, a taste test for transfer of flavor from the rotting fruits to the healthy fruits was impossible. Stem fungi and soft rot gave the tomatoes a characteristic odor of decomposing fruits. The wrappers had prevented the spread of the *carotovorus* infection, but the non-moistureproof transparent cellulose had become badly deteriorated from absorption of moisture from the rotting fruits.

It was concluded that the shipping box and not the wrappers was the controlling factor in retarding ripening and in producing a blanch. The practice of wrapping effectively retards the spread of inoculum to sterile fruits, especially the moistureproof transparent cellulose which prevents the exuded juice from dripping over healthy fruits.

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